

OCCURRENCE OF OVERWEIGHT AND OBESITY AMONG ADULT RURAL POPULATION IN EASTERN POLAND. RELATIONSHIP BETWEEN OBESITY AND SELECTED SOCIO-ECONOMIC FACTORS

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Abstract: The objective of the study was evaluation of the prevalence of overweight, obesity and abdominal obesity among adult rural population in the Lublin Region, and the relationship between the occurrence of obesity, and selected socio-economic factors. The study covered a random sample of 2,260 rural inhabitants – 1,390 females and 870 males; mean age 51.6. Overweight and obesity was diagnosed in 60% of the total number of the population examined (63.1% of males and 58% of females). Overweight was more frequently observed in males, while obesity more often occurred in females. The number of people with overweight and obesity increased with age. No statistically significant relationship was noted between the occurrence of obesity and abdominal obesity, and the occupation performed, occupational activity and source of maintenance of the people examined. Obesity and abdominal obesity was more often observed in those who were married.

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INTRODUCTION

Obesity, especially abdominal obesity is a very important risk factor of cardiovascular diseases and some types of cancer. It is also conducive to the development of metabolic and rheumatic diseases, diseases of the liver and biliary ducts, as well as respiratory diseases [6]. Within the last two decades in the majority of the developed countries worldwide a constant and significant increase in overweight and obesity has been noted. In 1997, the World Health Organization considered obesity as an epidemic [12]. According to the WHO, in 2002, in the world there were 1 milliard people with overweight and 300 million

of these were obese [13]. The relationship was confirmed between the occurrence of overweight and obesity according to age and gender. Scientific reports indicate a relationship between poor material standard and worse education level and a greater prevalence of obesity [9]. Until today in Poland, few comprehensive studies have been conducted concerning the prevalence of overweight and obesity, especially among the rural population.

The objective of the study was evaluation of the frequency of occurrence of overweight and obesity among the rural population in the Lublin Region, and the relationship between age, gender, marital status, education level, occupation performed, occupational activity and source of maintenance.

MATERIAL AND METHODS

The study was conducted during the period April–June 2006, by the method of two stage sampling. Based on patients' lists, in 32 randomly selected primary health care units located in rural areas of the Lublin Region, a group of patients aged over 18 was selected, which covered 2% of the adult population provided with care by an individual unit. The patients expressed their consent to participate in the study and were called in to the primary health care units, where trained staff performed the measurement of height and body mass, waist circumference, and collected information of socio-economic character.

The study covered 2,260 rural inhabitants; 1,390 females (61.5%) and 870 males (38.5%); mean age 51.6. The mean age of females in the study (52.5) was higher than that of males (50).

Based on the measurements, the BMI (Body Mass Index) was calculated.

According to the WHO standards, underweight was diagnosed when the BMI was less than 18.5 kg/m²; normal body weight when the BMI was within 18.5–24.9 kg/m²; whereas overweight – the BMI 25–29.9 kg/m², and obesity – the BMI exceeding 30 kg/m² (I° obesity – BMI 30–34.9 kg/m²; II° obesity – 35–39.9 kg/m²; III° obesity, when the BMI exceeded 40 kg/m²) [12].

According to the IDF (International Diabetes Federation) recommendations, in 2005 abdominal obesity was recognized when the waist circumference in females exceeded 80 cm, and in males – 94 cm.

Statistical analysis of the data was performed by means of Statistica 6.1 package. The discrete variables were compared in cross-tabulations with the use of Pearson's chi-square test. In addition, a multi-factor regression analysis of obesity parameters was performed with respect to age, gender, education level, marital status, occupational activity and the occupation performed.

RESULTS

Underweight was observed in 5.8% of the total number of patients in the study, normal weight – in 34.2%, overweight – in 34.1%, while obesity (including I° obesity – in

19.4%; II° obesity – in 5.2%; and III° obesity – 1.3%). In general, overweight and obesity were diagnosed in 60% of the total population in the study. Abdominal obesity was diagnosed in 54% of the people examined. Table 1 presents the relationship between the BMI and the gender of the patients.

Underweight was diagnosed in 2.4% of males, normal weight – in 34.5%, overweight – in 39.4%, and obesity – in 23.7% (including I° obesity – in 19.2%; II° obesity – in 3.6%; and III° obesity – 0.9%). In general, overweight and obesity were diagnosed in 63.1% of males. Abdominal obesity was diagnosed in 41% of the males in the study.

Underweight was diagnosed in 7.9% of females, normal weight – in 34.1%, overweight – in 30.8%, and obesity – in 27.2% (including I° obesity – in 19.5%; II° obesity – in 6.2%; and III° obesity – 1.5%). In general, overweight and obesity were diagnosed in 58% of females. Abdominal obesity was diagnosed in 62% of the females in the study.

Table 2 presents the relationship between the BMI and age of the patients.

Overweight occurred in 19.9% of people aged under 30, and obesity – in 4.7%. pathological obesity was not noted in any of the patients from this age group. In this age group, abdominal obesity was observed in 11.1% of males and 18.1% of females.

Among the total number of patients aged 31–60 overweight occurred in 35.6%, obesity – in 26.4% (pathological obesity – in 1.4%). Abdominal obesity was diagnosed in 41.8% of males and 62.3% of females in this age group.

In the total number of people examined aged over 60 overweight was observed in 37.6%, obesity – in 33.8% (pathological obesity in 1.6%). Abdominal obesity was noted in 55.4% of males and 78.3% of females in this age group.

The relationship between the occurrence of abdominal obesity and education level was on the border of statistical significance. Abdominal obesity was considerably more often observed among patients who did not possess any education or with incomplete elementary education level (65.1%), and among those who had elementary education (66.9%), followed by people with vocational education (48%), secondary school education (46.8%), and university education level (42.7%).

Table 1. Relationship between the BMI and the gender of the patients.

Gender		Under-weight	Normal weight	Over-weight	Obesity I°	Obesity II°	Obesity III°	Total
Male	n	21	300	343	167	31	8	870
	%	2.4	34.5	39.4	19.2	3.6	0.9	38.5
Female	n	110	474	428	271	86	21	1390
	%	7.9	34.1	30.8	19.5	6.2	1.5	61.5
Total	n	131	774	771	438	117	29	2260
	%	5.8	34.2	34.1	19.4	5.2	1.3	100.0

Table 2. Relationship between the BMI and age of the patients.

Age (years)		Under-weight	Normal weight	Over-weight	Obesity I°	Obesity II°	Obesity III°	Total
18–30	n	58	166	59	12	2	0	297
	%	19.5	55.9	19.9	4.0	0.7	0.0	13.1
31–60	n	54	430	453	249	70	18	1274
	%	4.2	33.8	35.6	19.5	5.5	1.4	56.4
61 and more	n	19	178	259	177	45	11	689
	%	2.8	25.8	37.6	25.7	6.5	1.6	30.5
Total	n	131	774	771	438	117	29	2260
	%	5.8	34.2	34.1	19.4	5.2	1.3	100.0

Based on the multi-factor regression analysis a relationship was noted between the more frequent occurrence of obesity and abdominal obesity and being married.

The method of regression analysis did not show any relationship between the occurrence of obesity and abdominal obesity, and the fact that the patient was occupationally active, type of occupation performed, and the main source of maintenance.

DISCUSSION

Analysis of the results obtained confirmed a high prevalence of overweight, obesity and abdominal obesity among the rural population in the Lublin Region. However, there is a shortage of comparable studies in order to determine whether the scale of the phenomena observed is characteristic only for the region examined, or is the result of an all-Polish tendency. Some of the studies conducted in the Lublin Region indicated that obesity is highly prevalent among rural females, while simultaneously no differences in birth weight were observed between rural and urban newborns [4, 7]. The majority of the studies conducted in Poland to date concerned populations within the defined age intervals, based on self-reported evaluations of patients, or conducted among patients who reported to a physician with other health problems. Comparable studies indicated that the prevalence of overweight and obesity among males was lower, and much lower among females than that observed among the rural population in the Lublin Region. In the all-Polish multi-centre study of the state of health of the population (WOBASZ project) conducted during the period 2002–2005, overweight and obesity were diagnosed in 61.6% of males and in 50.3% of the females examined [1]. In the study project NATPOL PLUS (2002) – overweight and obesity were noted in 53% of the respondents (48% of females and 58% of males) [14]. In the studies carried out in 2000 by the Institute of Food and Nutrition in the area of the whole Poland, overweight and obesity were diagnosed in 56.7% of males and 48.6% of females [10]. The phenomenon of overweight and obesity, however, shows an upward tendency in many countries. Probably, the more

frequent occurrence of overweight and obesity among the rural population in the Lublin Region results from the fact that the study was conducted 1–5 years later than the above-mentioned research.

Comparison of the results obtained with reports from other countries shows that overweight and obesity among the rural population in Eastern Poland are less prevalent, compared to the population in the USA, Greece, rural population in Sicily, while in the United Kingdom a similar scale of the phenomenon is observed, whereas in France and Scandinavian countries this phenomenon is considerably less prevalent [2, 3, 5, 8, 11]. The studies conducted during the period 1999–2002 in the USA by the NHANES showed that 65.7% of adult population of this country were overweight or obese [5]. In Greece, during the period 2001–2002 overweight and obesity was diagnosed in 73% of males and 56% of females [8]. Among the rural population in Sicily overweight and obesity were diagnosed in 77.5% of males and 73.4% of females [2]. In 2001 in the United Kingdom, these problems were diagnosed in 63% of males and 51% of females [11]. A better situation is noted in Scandinavian countries and in France. In 2001 in Denmark, overweight and obesity were observed in 51.8% of males and 39.5% of females [3].

The occurrence of a large number of patients with overweight and obesity among the rural population in Eastern Poland may be explained by the existing nutritional habits (high-energy diet rich with saturated fatty acids), and the constantly decreasing physical activity of this population group, which results primarily from the progressive mechanisation of agricultural production [10]. The decreasing physical activity in everyday work is not compensated by increased physical activity during leisure. Among the rural population, especially the older generation, applied forms of active leisure are practically unknown [10]. This is confirmed by the results which indicated the lack of relationship between the occupation performed (agricultural, non-agricultural), occupational activity and the prevalence of obesity. The prevalence of overweight and obesity may be influenced by a stereotype still alive among the older population who still remember the times of poverty and hunger,

that obesity is considered to be a synonym of health and wealth. It is difficult to determine what the effect is of low economic standard of the population examined on obesity. Some scientific reports indicate that there is a relationship between low material standard and higher prevalence of obesity [2, 9].

The Lublin Region belongs to the poorest regions of Poland, and consequently the poorest regions of the European Union. In addition, it was noted that the income of the rural population is by nearly 30% lower than that of the urban inhabitants. Studies conducted in 2000 by the Institute of Food and Nutrition showed that even great differences in household income are not reflected by the nutritional status of the population. Low income is compensated by buying cheaper, poorer quality food, and consumption of the food produced on own farm [10].

The results of studies confirmed the relationship between the prevalence of overweight and obesity and gender and age of patients. Overweight was more often diagnosed in males, while obesity more frequently occurred in females (also III° obesity). The prevalence of III° obesity among the rural population from the Lublin Region (1.5% of females, 0.9% of males) is greater than that observed by the Institute of Food and Nutrition in 2000, where giant obesity was diagnosed in 1% of females and 0.3% of males [10].

The analysis of the occurrence of obesity confirmed the commonly known fact that this phenomenon shows a growing tendency with age. A detailed analysis showed that obesity in males increases mainly at the age interval 31–50, and in females – 31–60.

The great prevalence of abdominal obesity is especially alarming due to its effect on health (41% of males and 62.1% of the females in the study). Such a great prevalence of abdominal obesity results from the adoption in the study of the new, most restrictive IDF criteria of 2005. The adoption of these criteria, however, enables comparison of the results obtained with the results from earlier studies.

The smallest number of people with overweight and obesity was noted among those who had the highest education level. However, the multi-factor regression analysis did not show any significant differences between education level and occurrence of obesity. Among the rural population people who were best educated were the youngest, and age is one of the main factors determining the occurrence of obesity.

Multi-factor regression analysis indicated that overweight and obesity occurred more often in people who were married. Marriage favours stabilisation, observance of tradition, and in traditional rural families women regularly prepare abundant meals consisting of several dishes which everyone consumes together. This tradition orders the consumption of all the meals that are on the table. It may be presumed that these habits, in combination with a decrease in physical activity, are the main causes of an increase in overweight and obesity. The problem, however, requires further studies.

SUMMARY

1. Overweight and obesity among the rural population from the Lublin Region, especially among females, are more prevalent compared to other regions of the country.

2. Overweight and obesity among the rural population from the Lublin Region are less prevalent, compared to the population in the USA, Greece, rural population in Sicily, while in the United Kingdom a similar scale of the phenomenon is observed, whereas in France and Scandinavian countries this phenomenon is considerably less prevalent.

3. Being married favours the occurrence of obesity and abdominal obesity.

REFERENCES

1. All-Polish and regional prevalence of the main risk factors of cardiovascular diseases. Results of all-Polish study of the state of health of the population. WOBASZ Project. *Kardiol Pol* 2005, **63** (Suppl. 4), 614-685.
2. Barbagallo CM, Cavera G, Sapienza M, Noto D, Cefalu AB, Polizzi F, Onorato F, Rini GB, Di Fede G, Pagano M, Montalto G, Rizzo M, Des-cowich GC, Notarbartolo A, Averna MR: Nutritional characteristics of a rural Southern Italy population: the Ventimiglia di Sicilia Project. *J Am Coll Nutr* 2002, **21**(6), 523-529.
3. Bendixen H, Holst C, Sorensen TI, Raben A: Major increase in prevalence of overweight and obesity between 1987 and 2001 among Danish adults. *Obes Res* 2004, **12**(9), 1464-1472.
4. Filip RS, Panasiuk L, Haratym-Maj A, Radzki RP, Bieńko M, Puzio I: Serum lipid profile and metabolic syndrome occurrence among obese rural women from Lublin Region (Eastern Poland). *Ann Agric Environ Med* 2006, **13**, 77-80.
5. Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM: Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *JAMA* 2004, **291**(23), 2847-2850.
6. Must A, Spadano J, Coakley EH, Field AE, Colditz G, Dietz WH: The disease burden associated with overweight and obesity. *JAMA* 1999, **282**, 1523-1529.
7. Pac-Kożuchowska E: Evaluation of lipids, lipoproteins and apolipoproteins concentrations in cord blood serum of newborns from rural and urban environments. *Ann Agric Environ Med* 2007, **14**, 25-29.
8. Panagiotakos DB, Pitsavos C, Chrysoshoou C, Rivas G, Kontogianni MD, Zampelas A, Stefanadis C: Epidemiology of overweight and obesity in a Greek adult population: the ATTICA Study. *Obes Res* 2004, **12**, 1914-1920.
9. Reas DL, Nygård JF, Svensson E, Sørensen T, Sandanger I: Changes in body mass index by age, gender, and socio-economic status among a cohort of Norwegian men and women (1990–2001). *BMC Public Health* 2007, **7**, 269. Available from: <http://www.biomedcentral.com/1471-2458/7/269>.
10. Szponar L, Sekuła W, Rychlik E, Oltarzewski M, Figurska K: *Badania indywidualnego spożycia żywności i stanu odżywienia w gospodarstwach domowych*. Instytut Żywności i Żywienia, Warszawa 2003.
11. *Tackling Obesity in England. Report by the Comptroller and Auditor General HC 220 Session 2000-2001, 15 February 2001*. The Stationary Office, London 2001.
12. World Health Organization: *Obesity: Preventing and Managing the Global Epidemic. Report of a WHO*. Consultation presented at: the World Health Organization, June 3–5, 1997. Geneva, Switzerland.
13. World Health Organization: *Reducing Risks. Promoting Healthy Life. The World Health Report 2002*. Geneva, Switzerland.
14. Zdrojewski T, Bandosz P, Szpakowski P: [Prevalence of the main cardiovascular risk factors in Poland. Results of the NATPOL PLUS study project. PLUS.] *Kardiol Pol* 2004, **61** (Suppl. 4), 1-26 (in Polish).