

AN EPIDEMIOLOGICAL STUDY REGARDING OBESITY PREVALENCE IN A RURAL AREA OF BIHOR COUNTY

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Abstract

Background and aims: A high prevalence of obesity is found at global and national level, representing an important problem for the public health. The purpose of this work was to develop preventive medicine by performing an epidemiological study in order to identify people with obesity. We also aimed to analyze obesity prevalence and the influence of the family medical history of obesity in the analyzed population segment. **Material and methods:** Between 2011 and April 2014 we have been working on a descriptive, observational study in a rural zone of Bihor County – the Curtuiuseni village. **Results:** In a relatively young population (average age around 50 years) the obesity prevalence was high (21.41%). The risk of obesity in the population with a positive family history of obesity was 2.2 higher compared with the population without. Abdominal obesity was more frequent in females (59.24%) than males (34.27%). **Conclusion:** We found a high prevalence of obesity (21.41%) in a rural population of Bihor County, but lower than the country average (31.40%). Pathological waist circumference, representing a risk factor for cardiometabolic diseases, was found in 48.32% of cases.

key words: obesity prevalence, overweight, pathological waist circumference.

Background and aims

Obesity, through its high prevalence at global and national level, represents an important problem of public health. Obesity is a disease accompanied by cardiometabolic and neoplastic comorbidities with a high impact upon the life quality, life expectancy. Higher is the degree of overweight, higher the impact [1-4].

At national level, the growth of obesity prevalence is proved through indirect data resulting from the epidemiological analysis of newly detected cases of diabetes mellitus. In the

last decade, type 2 diabetes mellitus (T2DM) prevalence has tripled and 82% of the diabetic patients are obese or overweight [5,6]. Nowadays, obesity and overweight frequency in Romania is estimated to be over 50%, with adult obese women being 20-25% more frequent than men. The prevalence of overweight is estimated at around 35-40% [7].

Excessive accumulation of fatty tissue is due to genetic and epigenetic factors but mostly to environment factors. Weight control and obesity prevention are followed by a reduction of the

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risk for cardiovascular, metabolic and oncologic diseases [8-10].

The purpose of this work was to develop preventive medicine by performing an epidemiological study in order to identify people with obesity. We also aimed to analyze obesity prevalence and the influence of the family medical history of obesity in the analyzed population segment. We analyzed the family history influence upon obesity to see if, in this geographical region, the responsibility of increased obesity prevalence is due to genetic heritage or to lifestyle (especially traditional culinary habits and the cessation of physical activity which is increasing also in rural areas). We have also studied the prevalence of abdominal obesity since this is often associated with diabetes mellitus, dyslipidemia, cardiovascular disease and hyperuricemia [1-4].

Material and methods

Between 2011 and April 2014 we have been working on a descriptive, observational study in a rural area of Bihor county- the Curtuiseni village. The study group comprised 2289 adults: 1001 men and 1288 women. Curtuiseni village has a total population of approximately 3768 inhabitants.

In this study, the following anthropometric parameters were recorded: height (H - in centimeters), weight (W - in kilograms), waist circumference (WC - in centimeters) and body mass index (BMI - in kg/m²) [7].

A value of BMI under 18.5 indicates that the subject is underweight. The normal weight is

considered between 18.5 and 24.9. Over this value the subject is overweight when is between 25 and 29.9, class I obesity between 30 and 34.9, class II obesity between 35 and 39.9, values over 40 indicating morbid obesity [11].

Waist circumference values over 80 cm for women and 94 cm for men are considered pathologically values indicating obesity [11].

Data regarding the medical history of obesity have been obtained by interviewing the patients and confronting the information with the medical files from the doctor's offices around the area.

Statistical Analysis. The statistical analysis was done by using the EPIINFO software, version 6.0, a program of the Center of Disease Control and Prevention (CDC) in Atlanta and WHO, adapted for medical statistics processing, and also the SPSS 19 software. We calculated the average frequency ranges and standard deviations. Tests of statistical significance were performed by Student method (t test) and χ^2 . We used in our study the concepts of relative risk (RR) and attributable risk (AR).

Results

As shown in Table 1, among the studied population women were predominating (56.27%), with a female-to-male ratio of 1.3:1. Over 50% subjects were under 50 years of age (51.99%), most of them under 40 years (34.56%). The average age of women was significantly higher than that of men (52.73 years vs. 47.03 years).

Table 1. Distribution of study group according to age and gender.

Age	Total		Females		Males	
	No.	%	No.	%	No.	%
<40 years	791	34.56	378	29.35	413	41.26
41-50 years	399	17.43	224	17.39	175	17.48
51-60 years	413	18.04	224	17.39	189	18.88
61-70 years	287	12.54	168	13.04	119	11.89
>70 years	399	17.43	294	22.83	105	10.49
Average age	50.24±7.28		52.73±8.12		47.03±7.43	

We also analyzed the family history of obesity, including the filiations of the family history, masculine side, feminine side or both, as shown in [Table 2](#).

Table 2. Case distribution according to family history of obesity (first degree relatives).

	Total		Females		Males	
	No.	%	No.	%	No.	%
Medical family history of obesity	609	26.61	364	28.26	245	24.48
Masculine side	139	6.07	88	6.83	71	7.09
Feminine side	362	15.81	135	10.48	82	8.19
Masculine + feminine	308	13.46	141	10.95	92	9.19

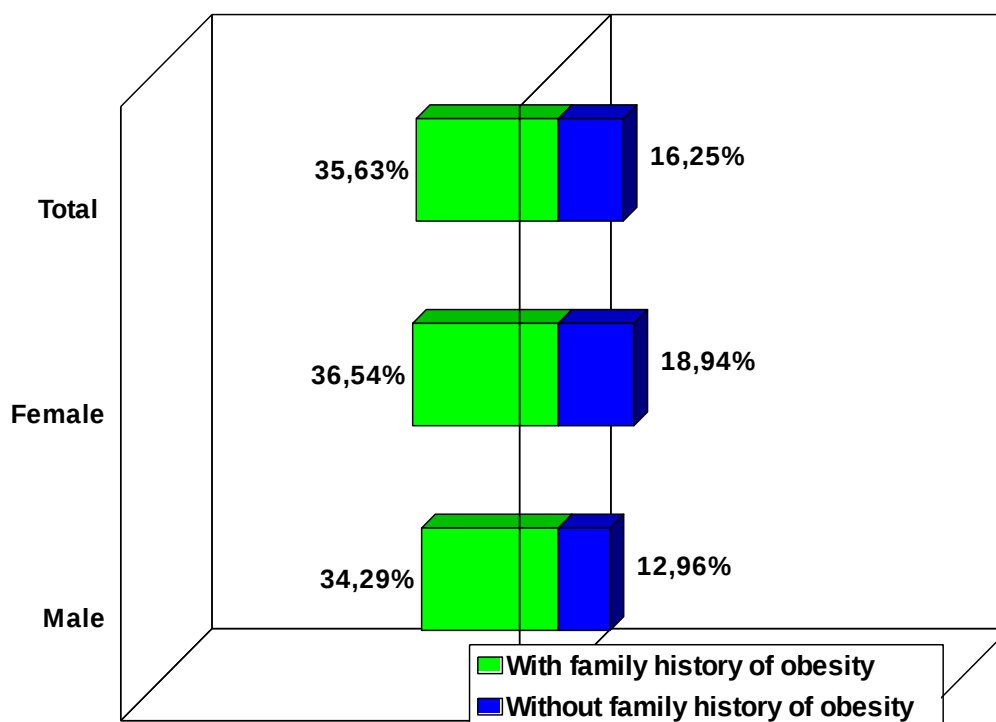


Figure 1. Obesity prevalence according to the medical family history of obesity.

From the 2289 participants in the study, 609 (26.61%) had a family history of obesity. A slightly higher percentage of women (28.26% vs. 24.48%) had a positive family history of obesity, without reaching statistical significance ($p=0,379$), as it can be seen in [Table 2](#).

As shown in [Figure 1](#), obesity prevalence was significantly higher in subjects with a medical family history of obesity compared to subjects with no case history (35.63% vs. 16.25%, $p<0.001$). This was found both in women (36.54% vs. 18.94%) and in men (34.29% vs. 12.96%).

Obesity risk in the population with a positive family history of obesity was 2.2 higher than in the population without family history ($RR=2.193$, $AR=0.194$), the risk being higher in men ($RR=2.645$, $AR=0.213$ compared to women ($RR=1.929$, $AR=0.176$).

Analyzing the BMI in our study population, we found an obesity prevalence of 21.41% as shown in [Table 3](#). This is lower than the country's average which is 31.4% according to PREDATORR's Study (Romanian National Study on the Prevalence of Diabetes, Prediabetes, Overweight and Obesity,

Dyslipidemia, Hyperuricemia and Chronic Kidney Disease) data. In the village's adult population, we have recorded a higher

percentage of obese women (23.91%) than men (18.18%) but without statistical significance ($p=0.137$).

Table 3. Obesity prevalence.

	Total		Females		Males	
	No.	%	No.	%	No.	%
Body mass index (BMI)						
Underweight	105	4.59	70	5.43	35	3.50
Normal weight	924	40.37	546	42.39	378	37.76
Overweight	770	33.64	364	28.26	406	40.56
Obesity	490	21.41	308	23.91	182	18.18
Class I obesity	315	13.76	168	13.04	147	14.69
Class II obesity	112	4.89	84	6.52	28	2.80
Class III obesity	63	2.75	56	4.35	7	0.70
Pathological waist circumference	1106	48.32	763	59.24	343	34.27

We recorded a significant ($p<0.001$) difference for the prevalence of class II and class III obesity between women (10.87%) and men (3.5%). Overweight had an overall prevalence of 33.64%, significantly higher in men than women (40.56% vs. 28.26%, $p=0.012$).

Abdominal obesity prevalence (defined according to the waist circumference values) was 48.32%, significantly higher in women than men (59.24% vs. 34.27%, $p<0.001$), as shown in [Table 3](#).

Discussions

In our study, we dealt with a relatively young population (the highest percentage (34.56%) being recorded for the age group under 40 years old and the lowest for the age group 61-70 years old), compared to average of Bihor county, where the percentage of young population (under 40 years old) is 28.18% (according to the Department of Statistics Bihor, after the last census) [[12](#)].

Taking into consideration the fact that the obesity risk for the population with a medical family history of obesity is 2.2 higher than in the population without a family history, we can presume that heredity has an important role in the emergence and maintenance of obesity.

Obesity is met often in a family's genealogy. Most of the monozygotic twins have similar body mass index values, no matter if they are raised together or separated. Likewise, body mass index in identical twins has more similar values compared to dizygotic twins. The BMI similarity with the biological parents was found also for the adopted children [[13,14](#)]. However, it's difficult to distinguish the role of the genetic factor from the environmental one, since it is a proven fact that in starving conditions, the most obesity prone individual does not show weight surplus [[13](#)]. The recent increase of obesity prevalence is too fast to be caused by modification of the common genetic background [[15](#)]. In our study we identified a high obesity prevalence among people with a positive family history (35.63%), but can we talk about hereditary inheritance or rather about the adoption of an obesity prone lifestyle, nutrition traditions and habits, or could we say that obesity in mothers has a significant impact in the emergence and maintenance of obesity in the offspring [[16,17](#)]? If one of the parents is overweight, the risk of the child to be overweight is 40%, if both of the parents are overweight the risk is doubled. Obese adults represent a real risk for descendants [[14,18](#)].

Nutritional habits specific to the rural area of Bihor County are mainly based on excessive food intake, characterized by increased consumption of animal fats, greasy milk, carbohydrates and strong alcoholic drinks before meals. In the rural zone, the aesthetic concept (caused by the lack of information about health risks) is that overweight is 'beautiful and healthy'. Thus, in most of the cases, women (persons with a decisive role in family's nutrition) supply traditionally prepared food, persuade the children to consume high amounts of food, satisfy beyond boundaries the need for sweets, therefore encouraging an unhealthy lifestyle, from a generation to another. Therefore, the children-get older with this kind of behavior with a high risk for obesity.

At national level, according to the PREDATORR's study results [19], class I obesity prevalence is 21.5%, compared to 13.76% in our study population; class II obesity prevalence is 7.2% while in our study it is 4.9%; finally, class III obesity national prevalence is 2.7%, almost equal to the one recorded in our study (2.75%). The prevalence of overweight is also similar, 34.6%, compared to 33.64% in our study. In China, Japan and in some African states the obesity prevalence is under 5%, in USA about 30% and in Middle East about 60%. In Nauru Island of South Pacific over 82% of the population is overweight and obese [13]. In the USA, obesity has a higher prevalence among women, among those with low social-economic status, in Black and Hispanic people [13,17,20]. In Western Europe, the recent increase in obesity prevalence has been recorded mostly in men compared to women, while in Central and Eastern Europe the prevalence is higher among women [7].

Morbidity and mortality associated with obesity is increased in Europe. Thus, annually at least 7% of deaths are due to overweight (70% cardiovascular cause, 20% neoplastic cause).

Obesity is responsible for the occurrence of ischemic heart disease in 30% of cases and of high blood pressure in 50% of cases [21]. In addition, in the last decade, the number of T2DM cases has tripled, 82% of them being obese or overweight. Moreover, in the USA an increase, superposable to that of obesity, of T2DM and metabolic syndrome prevalence has been encountered recently [13,20]. Finally, in Europe, the cancer prevalence due to obesity is increasing [22].

At the global level, obesity prevalence is increasing continuously, with differences from one country to another, from one region of the country to another, according to sex, age, ethnicity and social-economical status [7,16].

Nowadays, globally speaking, the body weight increase has a higher prevalence than underweight. In our study only 105 people have been identified as underweight, and 1260 persons as obese or overweight [18,13].

Conclusion

In our study population, obesity prevalence was 21.41%, lower than the country's average (31.4%). According to BMI, the highest prevalence was recorded for overweight (33.64%), followed by class I obesity (13.76%).

Pathological waist circumference was found in a high percentage (48.32%), indicating a high risk among studied population to develop cardiometabolic diseases.

Due to diseases (diabetes mellitus, cardiovascular diseases, cancer), for which obesity represents a risk factor, there is a decrease of life quality and life expectancy. In addition, obesity affects interpersonal relationships, determining negative emotional reactions and even social discrimination.

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