

## STUDY ON PRIMARY OBESITY IN SCHOOL CHILDREN

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### Abstract

We carried out a retrospective epidemiologic-clinical study, regarding primary obesity in school children (6 to 16 years old), who were admitted with different illnesses to 2<sup>nd</sup> Pediatric Clinic of the County Emergency Hospital Craiova, between 01.01.2010 and 31.12.2010. We calculated the body mass index (BMI);  $BMI = G (kg) / T^2 (m^2)$ . The results we obtained by taking anthropometric measurements were reported to the normal values for age and sex, according to the CDC 2000 nomograms. There were admitted, in this period of time, a number of 435 children, aged 6 to 16 years, among which 91 (20.9%) were obese and overweight. We studied the distribution of the overweight and obesity cases according to their social origin, sex, age groups, birth weight, feeding regime in the first 6 months of life, and parents' educational level.

**Keywords:** obesity, overweight, children

### Introduction

Obesity is a complex, multi-factorial illness, characterized by an increase of the body mass on the basis of the adipose tissue.

In the last decades, it has become one of the most frequent nutrition illnesses in the world, resembling a pandemic, according to the WHO 2011 report, being considered the 21<sup>st</sup> century illness (1).

The specialty literature and the performed studies have revealed a doubling of the obesity prevalence in children, throughout the world, in the last 30 years, both in the developed, highly industrialized countries, and in the developing countries as well (2).

### Material and method

We carried out a retrospective epidemiologic-clinical study regarding obesity in school age children (6 to 16 years old), admitted to the 2<sup>nd</sup> Pediatric Clinic of the County Emergency Hospital Craiova with various illnesses, throughout a one-year period (01.01.2010 - 31.12.2010).

Inclusion criteria: children aged 6 to 16 years, with a body mass index (BMI)  $\geq 95$  percentile/sex/age for obesity,  $85 \leq BMI < 95$  percentile/sex/age for overweight. The information taken by means of anthropometric measurements was reported to the normal values for age and sex, according to the CDC 2000 nomograms.

### Results

In this period of time, there were admitted a number of 435 children, aged 6 to 16 years, among which 91 were overweight and obese, representing 20.9%. Overweight was registered in 35 children, representing 8% of the 435 children admitted, aged 6 to 16 years, while obesity was registered in 56 children, who represented 12.9% of the total number of admitted children (fig.1).

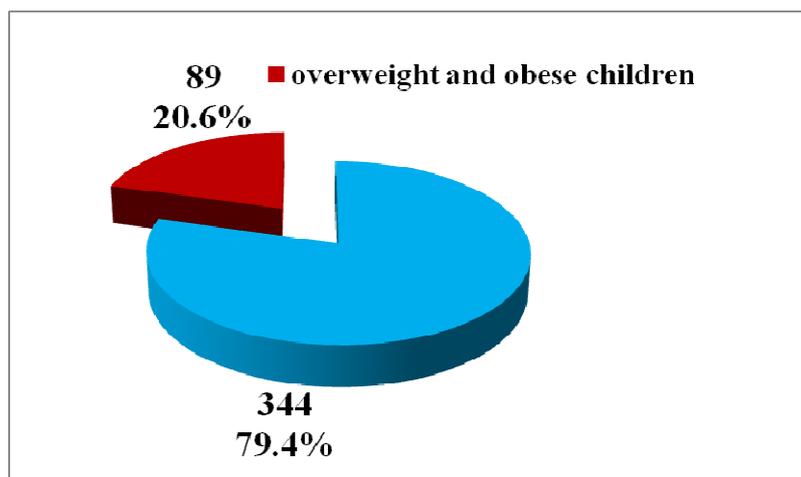


Fig.1 Prevalence of overweight and obesity in the admitted children.

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The distribution of the overweight and obesity cases according to sex showed: in the overweight children - 22

girls (62.9%) and 13 boys (37.1%); in the obese children: 32 (57.1%) girls and 24 (42.9%) boys (table 1).

Table 1. Distribution of overweight and obesity cases according to sex.

Sex	Overweight		Obesity	
	N	%	N	%
<b>F</b>	<b>22</b>	<b>62.9</b>	<b>32</b>	<b>57.1</b>
<b>M</b>	13	37.1	24	42.9
<b>Total</b>	<b>35</b>	100	<b>56</b>	100

The distribution of the overweight and obesity cases according to their social origin was as follows: in overweight children - 18 (51.4%) children from urban areas

and 17 (48.6%) from rural ones; in obese children - 32 (57.1%) came from urban areas, while 24 (42.9%) from rural ones (fig.2).

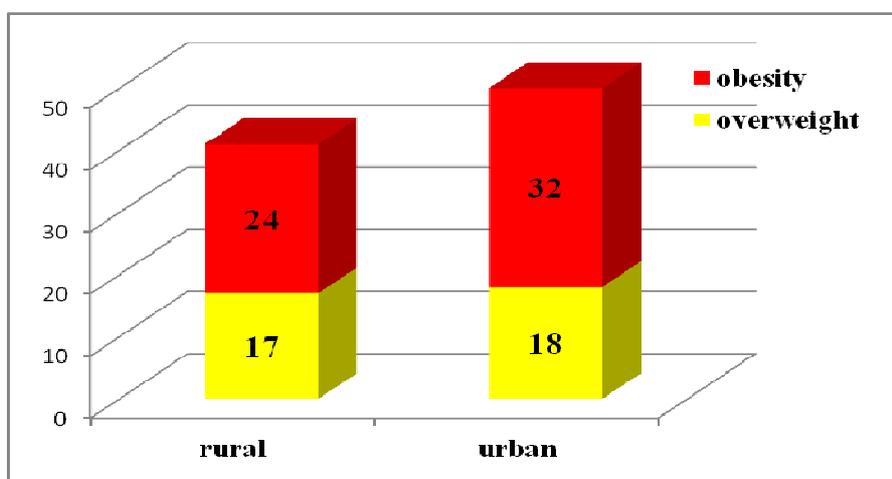


Fig.2 Distribution of the overweight and obesity cases according to social origin.

According to age group criterion, the distribution of the cases was: in overweight children - 7 (20%) children belonged to the 6-10 years group, 17 (48.6%) to the 10-14 years group, 11 (31.4%) to the 14-16 years group; in obese

children – in the 6-10 years group there were 16 children (28.5%), in the 10-14 years group 31 (55.4%) while in the 14-16 years group 9 children (16.1%) (fig.3).

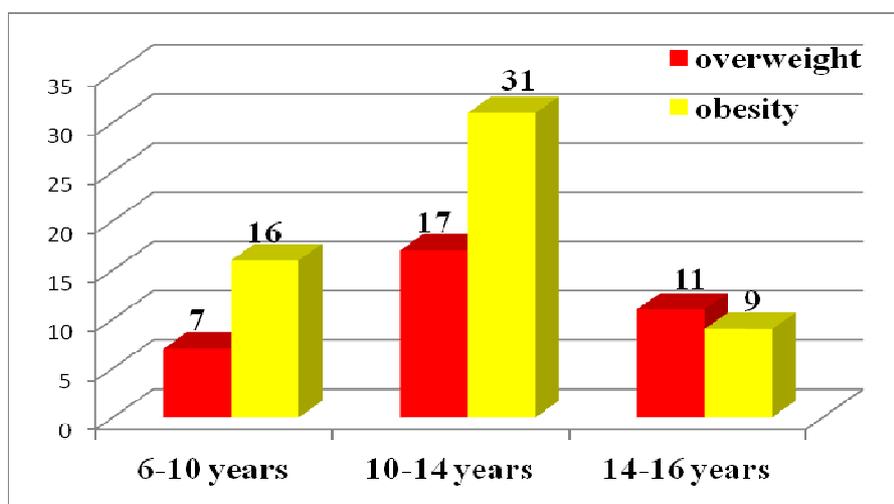


Fig.3 Distribution according to age groups in the overweight and obesity cases.

The birth weight (BW) in the overweight children showed: BW 2500-2800 g in 6 cases (17.1%), BW 2800-4000 g in 20 (57.2%), BW > 4000 g in 9 (25.7%) cases. In the obese children we recorded: 5 (8.9%) had a BW between

2000 and 2500 g, 14 (25%) between 2500 and 2800 g, 26 (46.5%) between 2800 and 4000 g and 11 (19.6%) BW > 4000 g (fig.4).

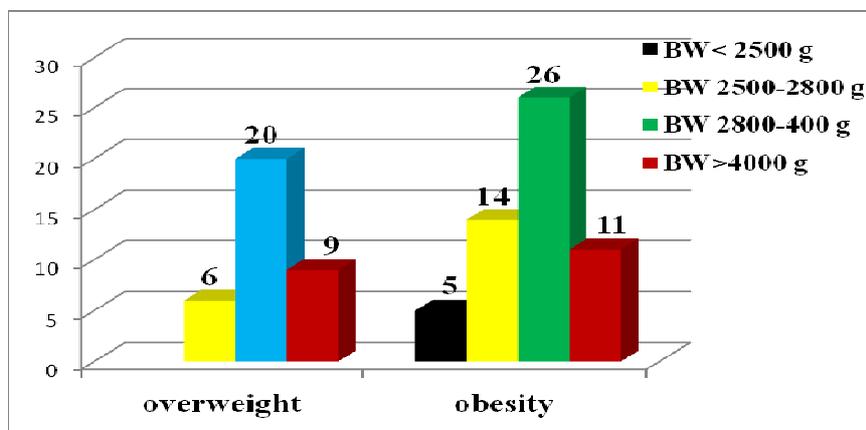


Fig.4 Birth weight in obese and overweight children.

The feeding in the first 6 months of life in overweight children: breastfeeding in 21 (60%), bottle feeding in 10 (28.6%), mixed in 4 (11.4%). Bottle feeding was done with powder milk in 7 children (70%) and cow's milk in 3 (30%).

In the obese children: breastfeeding in 36 (64.3%), bottle feeding in 15 (26.8%), mixed in 5 (8.9%). In the bottle-fed children, 7 (46.7%) received powder milk and 8 (53.3%) cow's milk (table 2).

Table 2. Feeding in the first six months of life in the overweight and obese children.

Feeding type	Overweight		Obesity	
	N	%	N	%
<b>Breastfeeding</b>	21	60	36	64.3
<b>Bottle feeding</b>	10	28.6	15	26.8
<b>LP</b>	7	70	7	46.7
<b>LV</b>	3	30	8	53.3
<b>Mixed</b>	4	11.4	5	8.9
<b>Total</b>	35	100	56	100

Feeding diversification in overweight children was done before the age of 4 months in 12 (34.3%) children, between 4 and 6 months in 15 (42.9%) and after the age of 6 months in 8 (22.8%) children. In obese children,

diversification before the age of 4 months was done in 20 cases (35.7%), between 4 and 6 months in 24 (42.9%) children, while in 12 (21.4%) diversification started after the age of 6 months (fig.5).

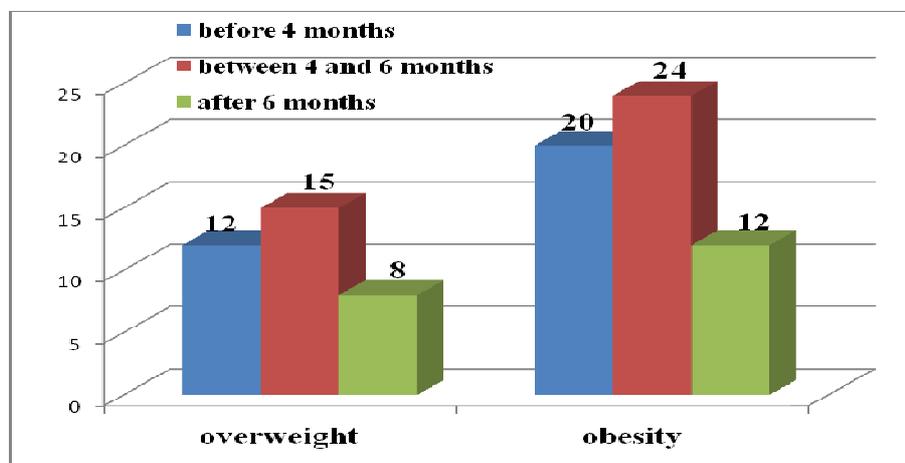


Fig.5 Feeding diversification in overweight and obese children.

Analyzing the educational level of the parents with obese and overweight children, we noticed for the overweight children: 10 (28.6%) parents graduated secondary school only, 20 (57.1%) high school and 5

(14.3%) higher education institutions. For the obese children, we noticed: 16 (28.6%) parents had secondary school studies, 30 (53.6%) high school studies and 10 (17.8%) higher education studies (table 3).

Table 3. Educational level of the parents with obese and overweight children

Parents' educational level	Overweight		Obesity	
	N	%	N	%
Secondary school studies	10	28.6	16	28.6
High school studies	20	57.1	30	53.6
Higher education studies	5	14.3	10	17.8
Total	35	100	56	100

### Discussions

Among the 435 school children who were admitted, 91 were obese or overweight, representing 20.9%; we registered a number of 35 overweight children (8%), and 56 obese children (12.9%).

A study which was carried out by Prof. I. Popa and colab in the western part of the country in children aged between 3 months and 16 years identified 14.7% obese children: 18.6% infants, 15% preschool children and 14.2% school children (3).

Another study carried out in the 2005-2006 period in the children aged between 11 and 15 years, and published in a report of The International Association for the Study of Obesity (IASO), London 2009, showed that, in Romania, the overweight prevalence was 14.4% in girls and 8.8% in boys (4).

The results obtained in our study revealed that the prevalence of overweight and obesity in school children had values close to those published on obesity in children in our country.

The National Study "Health and Nutrition Examination Surgery"(NHANES III (1976-1980 and 2003-2004) shows an increase of the overweight prevalence in the 6-11 years age group from 6.5% to 18.8%, while in the 10-14 years age group from 5% to 17.4% (5).

Our study revealed a prevalence of obesity (12.9%) higher than that of overweight (8%). The obesity prevalence was 1.6 times higher than the overweight prevalence.

The distribution of the overweight and obese children according to sex showed a higher frequency in girls, both regarding the overweight (62.9%) and the obesity (57.4%).

The information in the specialty literature (IASO, 2009) showed a higher prevalence of overweight in girls (14.7%) rather than in boys (8.4%) (6).

Numerous studies showed that an increasing number of children do not exercise, girls being more numerous than boys (7).

We registered a prevalence of the overweight and obesity in the urban children.

An explanation could be the fact that, in urban areas, children have an easy access to sweet soft drinks with a high level of sugars and calories, to food with high energy content (fast-food type), instead of consuming milk, fruits and vegetables (8).

Children, especially those in the urban areas, spend more time in front of the TV set and the computer rather than doing physical activities.

There are studies that show that 83% of the children spend, daily, more than 5 hours watching TV, 34% more than 4 hours daily in front of the computer, 25% of the children are completely sedentary and only 26% take part in sport activities organized by school.

Sports, walking, biking, outdoor games are all replaced by car driving, using the elevator, indoor games, playing on the computer, watching TV (9).

The age group distribution in the overweight children showed a higher frequency (□□50%) in the 10-14 year-age group, followed by the 14-16 year-age group, 31.4% and the 6-10 year-age group 20%. Most of the obese children (55.4%) belonged to the 10-14 year-age group, followed by the 6-10 year-age group (28.5%) and the 14-16 year-age group (16.5%).

The preschool and primary school period is extremely important for the prediction of a future obesity.

The excessive food intake undoubtedly represents the main exogenous factor, with a role in the genesis or perpetuation of the obesity (10).

The analysis of birth weight showed, in the overweight children: more than half of the children had a normal weight at birth. It is worth mentioning that 25.8% (□□1/4 of the children) had a birth weight more than 4000 g. 46% of the obese children had a normal birth weight. About a quarter of the obese children had the birth weight more than 4000 g.

High birth weight is considered a risk factor for obesity.

Feeding in the first six months of life in the overweight children was breastfeeding for 60% of the children and mixed for 40% of them. Most of the obese children (64.3%) were breastfed, while 30.2% had bottle or mixed feeding.

The diversification of food in the overweight children was correctly done in most of the cases in the 4-6 month-age group (42.9%), in 34.3% of the cases was done before the age of 4 months, and in 22.8% of the cases after the age of 6 months. The diversification in the obese children was done, in most of the cases, in the 4-6 month-age group (42.9%), before the age of 4 months in 35.7%, while in 21.4% of the children after the age of 6 months.

Breastfeeding represents a protection factor against obesity. The protective role of breastfeeding was not

correlated with the social class and life style differences (10).

Promoting a longer period of breastfeeding, in the industrialized countries, may lead to a decrease of obesity prevalence among children.

The analysis of parents' educational level showed, both in the overweight and in the obese children, that, in most of the cases, parents had high school studies (57.1% in the overweight and 53.6% in the obese); in 28.6% of the overweight and obese cases parents had secondary school studies, while 14.3% of the overweight children and 17.8% of the obese children had their parents with higher education studies.

The familial environment has, among the environmental factors, the greatest impact upon the nutritional status of children.

Children depend on their parents in providing food, and feeding habits are constrained and modulated by the

food selections of the parents who, at their turn, are influenced by the cultural, economic context, including the cost, advantage, taste and accessibility of the food (7).

### Conclusions

1. Prevalence of overweight and obesity in admitted school children was 20.9%.

2. Prevalence of obesity was 12.9%, while of overweight 8%.

3. Obesity had a frequency of 1.6 times more than overweight.

4. Overweight and obesity were more frequent in girls, in urban children and in the 10-14 year-old group.

5. 1/4 of the overweight and obese children had a birth weight more than 4000 g.

Creating certain healthy food habits since an early age is important for keeping a good health in the long run and for preventing obesity.

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