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Nutritional Status in 9-15-years-old Schoolchildren from Sofia, Bulgaria /1984-2002/

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The aim of this paper is to identify trends in the frequency distribution of underweight (I+II+III degrees), normal nutritional status and overweight (incl. obesity) in children and adolescents from Sofia, tested in 1984/1987 in comparison with those of their peers in 2001/2002 year. As a result, in the beginning of 21st century among all boys the incidence and prevalence of underweight and that of overweight increases, whereas the frequency of normal nutritional status decreases. In girls, there are two trends – the same as in boys before puberty (age 9-10) and in those aged over 11 only the incidence of underweight increasesq especially in 14 and 15 years. The results in boys and in girls before puberty are similar to these observed in other Eastern European countries in recent pereiod.

Key words: Nutritional status, adolescents, children, underweight, overweight.

Introduction

One of the most discussed issues in auxology is the assessment of nutritional status (NS) in children and adolescents in population studies. In recent decades, for this purpose the most commonly used mean is body mass index (BMI). It has established national and ethnic differences. This requires the creation of both international standards and relevant national norms. Recently the most popular method for constructing normalized growth standards in anthropological and medical practices is the LMS method. On the basis of this method a set of cut-off point of BMI has been established to determine the type of NS in children, adolescents and adults – underweight, overweight and obesity [2, 3].

In Bulgaria there are not national standards of physical development from nearly 30 years. Data on the frequency distribution of different types of NS in children and adolescents are few and part of them relate to areas outside the capital of Bulgaria [5, 9], which led us to formulate the purpose of this communication, including:

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Materials and methods

Data from two cross-sectional anthropometric studies of 9-15-year-olds schoolchildren in Sofia have been analyzed [7, 8]. The studies were conducted in 1984/1987 and in 2001/2002. The first study included 405 boys and 421 girls, and the second one – 569 boys and 573 girls, divided fairly evenly in one-year age groups. By standard anthropometric methods for each student are measured body height and body weight, additionally has been calculated body mass index (BMI=body $weight_{(kg)}$/body $height^2_{(m)}$). The distribution of students in the categories of NS is made after Cole et al. [2, 3]. Reliability of differences in BMI of boys and girls from the two surveys by age groups was determined by Student's t – test, and the differences in the frequency of students from two studies in each category NS (separately for both sexes) – respectively by χ^2 test.

Results and discussion

The results of the categorization of students in both studies present that with the exception of 9-year-old boys and 13-year-old girls underweight is more common in students surveyed in 2001/2002 (Tabl. 1). From the beginning to the end of the investigated age period there is a incresing trend of underweight by age, which at age 15 reaches ~ 20.0% in both sexes. This is significantly higher than in 1984/1987, when the highest incidence of underweight was in age of 13 – 10.0% of boys and 16.0% in girls. As for the category of overweight it was found that in most age groups of boys the incidence of overweight and obesity increased while in girls after age 11 it seems to exist an opposite trend – a decrease of its frequency by age, particularly sharp at 14 and 15 years.

As a result, in the beginning of 21st century among all boys the incidence and prevalence of underweight and that of overweight increases, whereas the frequency of normal NS decreases.

In girls, there are two trends. In the age of 9 and 10, ie in infantile and prepubertal stages of development, there is a simultaneous increase in the number of underweight girls and those with abnormal body feed (like boys). From 11 years onwards, however, only the incidence of underweight increases. Obviously the differences in distribution of NS types in girls before and after the onset of puberty are sexual related (whether biologically or genderly is another matter). By overlaying the two opposing tendencies in girls produce a rise in the frequency of individuals with underweight and reduction of this of overweight and obesity, and to virtually the same proportion of girls with normal NS (Fig. 1). As a final result, the differences between the general samples of girls surveyed in the 1980s, and in 2001/2002 are lower than for boys. There is a reduction in the number of subjects with normal body feed and increase of individuals with underweight and overweight in boys at all, and in girls before puberty. We believe that the above increase in the proportion of subjects with deviant NS may be due to the increased social differentiation during the transition period in Bulgaria, whose existence is not in doubt. A similar phenomenon has been observed in other countries of Eastern Europe [1, 4]. The increased expression of this phenomenon in boys may be related to the greater sensitivity of the male body to the factors of the social environment, long celebrated in the writings of many well known authors [6]. Regarding the absence of such a phenomenon in girls during and especially after puberty could be related with socio-cultural changes during this period, such as the widespread use of irrational nutrition, the reduced motor activity, the application of different diets among students and others.

Table 1. Distribution of the investigated schoolchildren into nutritional status categories.

Age (yrs)	N	Underweight		Normal		Overweight+Obesity	
		n	%	n	%	n	%
BOYS (1984/1987)							
9	30	2	6.7	24	80.0	4	13.3
10	54	4	7.4	39	72.2	11	20.4
11	84	7	8.3	66	78.6	11	13.1
12	72	6	8.3	53	73.6	13	18.1
13	69	7	10.1	55	79.7	7	10.1
14	60	1	1.7	52	86.7	7	11.7
15	36	2	5.6	29	80.6	5	13.9
GIRLS (1984/1987)							
9	34	1	2.9	29	85.3	4	11.8
10	66	7	10.6	50	75.8	9	13.6
11	65	5	7.7	50	76.9	10	15.4
12	58	8	13.8	40	69.0	10	17.2
13	86	14	16.3	58	67.4	14	16.3
14	49	4	8.2	31	63.3	14	28.6
15	63	6	9.5	50	79.4	7	11.1
BOYS (2001/2002)							
Age (yrs)	N	Underweight		Normal		Overweight+Obesity	
		n	%	n	%	n	%
9	81	2	2.5	64	79.0	15	18.5
10	79	11	13.9	57	72.2	11	13.9
11	82	9	11.0	54	65.9	19	23.2
12	83	10	12.0	59	71.1	14	16.9
13	76	12	15.8	52	68.4	12	15.8
14	83	14	16.9	54	65.1	15	18.1
15	80	16	20.0	56	70.0	8	10.0
GIRLS (2001/2002)							
9	81	7	8.6	59	72.8	15	18.5
10	80	11	13.8	51	63.8	18	22.5
11	80	8	10.0	60	75.0	12	15.0
12	85	13	15.3	64	75.3	8	9.4
13	83	9	10.8	63	75.9	11	13.3
14	82	14	17.1	58	70.7	10	12.2
15	82	17	20.7	64	78.0	1	1.2

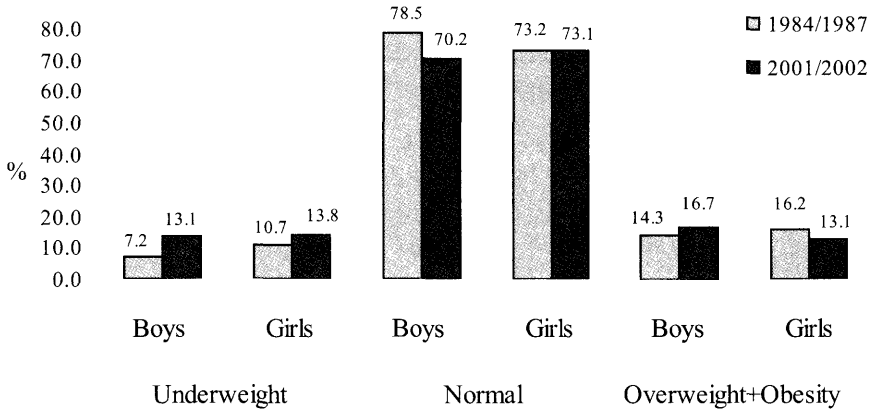

Figure 1. Frequency of the schoolchildren into nutritional status categories.

Conclusion

In the beginning of 21st century among all boys the incidence and prevalence of underweight and that of overweight increases, whereas the frequency of normal nutritional status decreases. In girls, there are two trends – the same as in boys before puberty (age 9-10) and in those aged over 11 only the incidence of underweight increasesq especially in 14 and 15 years.

The results of this paper outline a social problem in Bulgaria which has been neglected until now due to the fact that the focus of researchers, institutions and the public interest lies mostly in overweight and obesity. It confirms the need of further research, which will provide to relevant national standards for NS in the young generation of Bulgaria.

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