

Analysis of nutrition of preschool-age and younger school-age boys and girls

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Abstract:

The research involved 142 children from Montenegro, 80 of preschool age and 62 from the first grade of elementary school, with the aim of analysing the state of nutrition of children of preschool age and the youngest school age. The children's state of nutrition was verified by means of BMI percentile values. By analysing the results of our research, a worrying figure is that the subject population of children, with age, are more and more faced with the issue of excessive body weight and are approaching the borderline of obesity, especially when it comes to boys. In order to deal preventively with issues that we and the subject population are faced with, it is necessary to aggressively act upon, above all, the reduction of hypokinesia, by raising awareness of physical activity, first of all in preschool institutions and schools, and subsequently by high-quality nutrition, and by educating children as well as their parents.

Key words: children, BMI, nutrition, obesity.

Introduction

Obesity is one of the main health issues the modern society is faced with (WHO, 2000), and which arises as the result of the imbalance between energy intake and consumption (Bukara-Radujković, & Zdravković, 2009). Aside from hypokinesia and inadequate nutrition, on childhood obesity also have an effect psychogenic, physiological, pathophysiological factors (Mitrović, Pelešić, & Pelešić, 2014). Children that have increased body mass are faced with serious health risks which are life-threatening (Janssen, Katzmarzyk, & Ross, 2004; Daniels, 2006). The body mass index (BMI) is a simple index that represents the ratio of the body mass and body height, and it is normally used for classifying excessive body mass and obesity. It is defined as the ratio of the body mass and the square of the body height in meters (kg/m²). The body mass index can be regarded as an alternative for direct measuring of the body mass. Furthermore, the body mass index is a cheap and simple method to utilise. For children and young people the body mass index is calculated according to their age and gender, and it is very specific because of their growth and development. Childhood obesity has not yet been diagnosed in a proper manner, and has not been sufficiently examined, but it is known that in a ten-year period in certain countries childhood obesity doubled or tripled, and in some other countries it even quadrupled (Despotović et al., 2013). Worldwide, obesity has more than doubled since 1980. Even 65% of the world population live in the countries in which increased weight and obesity are larger issues than famine. In 2004 the World Health Organization adopted the Global Strategy on Diet, Physical Activity and Health, whose primary goal was the improvement of health by means of proper nutrition and physical activity. In order to successfully achieve this goal it is necessary for the national programmes to include children and young people, and the institutions created for this population are especially important for forming the habits that contribute to the preservation and improvement of health, such as proper nutrition, the promotion of physical activity or limiting the time spent in front of a screen (WHO, 2014). The most important parents' task in early development is to be the carriers of habits related to nutrition and of their changes in early childhood. The influence of the environment on children's nutrition and emergence of obesity was proved, especially eating habits of their parents as well as the influence of parents' behaviour on the emergence of childhood obesity (Anzman, Rollins, & Birch, 2010). The aim of this research is to analyse the state of nutrition of children of preschool age and the youngest school age.

Method

The research involved 142 children from Montenegro, 80 of preschool age and 62 pupils from the first grade of elementary school. Of the total number of children, there were 74 boys (52,11%) and 68 girls (47,89%). The children's state of nutrition was verified by means of BMI percentile values. The body height was measured by a stably attached height indicator (anthropometer) on which there were clearly visible marks of centimetres and millimetres. During the measurement process, the child was barefoot, only in underwear, with skin-tight heels, standing upright (with the spine in the upright position), standing on a flat, firm surface, with the head in

such a position that the Frankfurt plane (the line that connects the inferior margin of the left orbit and the upper margin of the left external auditory meatus) occupied the horizontal position. The researcher who was measuring the body height was positioned on the child's left side, was controlling the position of the height indicator and the position of the child, and was lowering the slider on the height indicator down to the child's vertex. The body mass was measured by the decimal scale placed on a flat surface in a stable position. During the measurement process, children were barefoot, dressed only in underwear, standing completely still with skin-tight heels. Every ten measurements it was checked whether the scale was indicating the "zero degree". The state of nutrition of children was analysed by calculating the body mass index, $BMI = BW \text{ (kg)} / BH \text{ (m}^2\text{)}$. The children whose BMI was above the 95th percentile for the appropriate age and gender, were marked as obese, and the excessive body mass was designated as the BMI between the 85th and the 95th percentile (Table 1.). After analysing and processing the acquired data by means of appropriate methods of descriptive statistics, the acquired data will be shown in the tables.

Results

Having calculated the body mass index for the children and young people, its numerical value is represented on the CDC BMI growth chart for age (for boys or girls) in order to achieve the percentile rank. The body mass index on the percentile indicates the relative position of a child among the children of the same age and gender. The rise in the values of the body mass index on the chart indicates the severity of the condition by category (malnutrition, normal weight, excessive weight, and obesity).

The BMI for age groups, the severity of the condition and the appropriate percentiles are shown in Table 1.

Table 1. Categorisation by percentiles

Category	Percentile range
Malnutrition	less than 5 (<5)
Normal weight	5 to 85
Excessive weight	85 to 95
Obesity	Equal or >95

The categorisation from the table is a recommendation of the Centers for Disease Control and Prevention-CDC.

In Table 2. the structure of the boys of preschool age (4, 5 and 6 years), and of the first grade primary school male pupils (7 years) is shown. The average height and body weight are shown for the above mentioned age groups, as well as the BMI percentile values. On the basis of these BMI percentile values, the boys aged 4 and 5 fall into the category of normal body weight (Table 1.), while the boys aged 6 and 7 fall into the category of excessive body weight, approaching the values that point to the occurrence of obesity.

Table 2. Analysis of results for boys by age

No. of examinees	Age	Body weight (BW-kg)	Body height (BH-cm)	Percentiles	BMI
10	4	16,70	105,8	27	16,3
13	5	20,20	111,6	65	15,9
20	6	23,51	117	92	17,5
31	7	29,13	128,09	90	17,7

In Table 3. the structure of the girls of preschool age (4, 5 and 6 years), and of the first grade primary school female pupils (7 years) is shown. The average height and body weight are shown for the above mentioned age groups, as well as the BMI percentile values. On the basis of these BMI percentile values, the girls aged 4, 5 and 6 fall into the category of normal body weight, while the girls aged 7 are on the borderline of excessive body weight.

Table 3. Analysis of results for girls by age

No. of examinees	Age	Body weight (BW)	Body height (BH)	Percentiles	BMI
10	4	18,20	105,7	65	16,2
5	5	18,82	113	34	14,9
22	6	23,44	121,68	54	15,5
31	7	27,84	126,29	84	17,6

The shown percentile values of the body mass index give an insight into the state of nutrition of the analysed sample of boys and girls. By analysing the acquired BMI index percentile values for boys and girls with the categorisation of the state of nutrition from Table 1, it is possible to ascertain that the coefficients of the average BMI values for boys and girls according to the given categorisation imply normal body weight.

Discussion

According to the data of the World Health Organization (WHO) about 2,1 billion people suffer from excessive body weight, 160 million children, of which even 22 million is under five years of age. The prevention of obesity occurs more frequently in western countries, where the figures indicate that in the last twenty years the number of those who suffer from excessive body weight has increased three times. The number of obese children aged 6–15 is from 22% to 31% with a constant rising tendency (Reilly, & Dorosty, 1999). It is estimated that nowadays in the USA every fourth child is obese (Nicklas et al., 2001). If no preventive measures are taken, as far as the modern lifestyle with all the characteristics of hypokinesia are concerned, the numbers will continually rise, so it is believed that this number will be larger for about 1,3 million children every year (Kosti, & Panagiotakos, 2006). Due to its simplicity of calculating and assessing obesity in the world, even in our part of the world the most popular and the most often applied method for assessing the state of nutrition is the body mass index (BMI). The body mass index represents an important indicator of the state of nutrition and of the risk to health (Janssen, Katzmarzuk, & Ross, 2004). When it comes to our neighbouring countries, the children from the two analysed regions of Bosnia and Herzegovina have normal body weight so it is asserted that such results are the consequence of an ever-growing number of sports schools that are being opened in the area of these two regions, and that there is a possibility that many children involved in this sample undergone various kinesiological activities which contributed to maintaining the normal body mass (Mitrović, Pelemiš, & Pelemiš, 2014). The results of the study (Despotović et al., 2013.) pointed to an evident presence of the issue of excessive body mass during the enrolment in the first grade of primary school, as well as to the existence of a considerable balance of the presence of excessive body mass and obesity in this group of children. By analysing the results of our research, a worrying figure is that the subject population of children, with age, are more and more faced with the issue of excessive body weight and are approaching the borderline of obesity, especially when it comes to boys. Preventive measures against childhood obesity need to include increasing physical activity, reducing the energy intake, changing the factors that influence the excessive body mass and obesity, and which originate from the surrounding and from the educational work with parents (Despotović et al., 2013).

Conclusions

One of the main causes of obesity in children are the genetic factors, the very behaviour, but also the family environment in which a child grows up (Ahmad, Q.I., Ahmad, C.B., & Ahmad, S.M., 2010). Also, the main causes of obesity are also seen in missing the breakfast and in consuming unhealthy food (Niemeier et al., 2006). In order to deal preventively with issues that we and the subject population are faced with, it is necessary to act aggressively upon, above all, the reduction of hypokinesia, by raising awareness of physical activity, first of all in preschool institutions and schools, and subsequently by high-quality nutrition, and by educating children as well as their parents. Kinesiologists and teachers should timely recognise this issue and advise the child and their parents on the proper lifestyle necessary for maintaining the normal body weight. In order to draw some more concrete conclusions, it is necessary for the future research to take into account a much larger number of factors, as well as a larger number of examinees of different ages, so that we could maybe detect the crucial period as far as the emergence of excessive body weight and obesity is concerned, and to preventively act against these issues and to attempt to put an end to the influences of the modern way of life.

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