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Original scientific  
paper

Paper received: Oct 3 2017  
Paper accepted: Feb 22 2018  
Article Published: Sep 10 2018

## *The Impact of the Additional Programme of Kinesiological Activities on the Morphological Status of Preschool Children*

### Extended summary

Given the fact that obesity in children of preschool age is on the rise and that it affects 25% of children in Canada, and as many as 22 million children younger than five (Canning et al., 2004; Cragg et al., 2007) around the world, the need for programmed physical exercise is pressing. In developed countries, such as the USA, the prevalence of obese children goes hand in hand with the increasingly higher levels of obesity (Sturm, 2007). According to Sturm, the prevalence of obesity for BMI>30 increased by 24% in the period 2000-2005, by 50% for BMI>40, while the prevalence for BMI>50 was higher by 75%. The aim of the conducted research was to determine scientifically, by applying experimental methods, whether an additional program of physical exercises carried out under regular working conditions at preschool institutions can result in significant changes in the morphological characteristics of preschool children, mean age  $6.21 \pm 0.56$  years. A total of 64 preschool children, girls (n=28) and boys (n=36) attending preparatory preschool lessons in the preschool institution “Čukarica” in Belgrade were included in the research. The researchers used a pre-experimental draft survey, namely the draft involving one pretest-posttest group. The sample of the morphological measuring instruments was designed by applying a reduced theoretical model (Viskić, 1972; Kurelić et al., 1975). The following anthropometric measures were used as measuring instruments: I For measuring longitudinal dimensionality of the skeleton: 1) height (0,1 cm); II For measuring the volume and body mass: 2) weight (0,1 kg), 3) mean thorax circumference (0,1 cm), 4) mean upper arm circumference (0,1 cm) and 5) mean lower arm circumference (0,1 cm); III For measuring subcutaneous adipose tissue: 6) abdominal skin layers (0,1 mm), 7) skin layers at the back (0,1 mm), 8) upper arm skin layers (0,1 mm). The recent research and studies indicate that the percentage of using standard anthropometric methods for defining morphological

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types and determining the structure is around 33%, whereas BMI method prevails by 25% over all other methods (Silva et al., 2013). In addition, the fact is that height/weight ratios used for calculating the Body Mass Index (BMI), which is a significant indicator of the nutrition level (Janssen et al., 2004), are indeed solid indicators of health risks and children's growth and development. Bearing this in mind, and using the values of two variables, *body height* and *body weight*, the body mass index was calculated by dividing the value of the respondents' weight expressed in kilograms with the square body height in metres following this formula:  $BMI = (TT(\text{kr})/TB(\text{m}^2))$ .

I For evaluating the nutrition level: 1) Body Mass Index ( $\text{kg}/\text{m}^2$ ). The experimental factor was realised over a period of 24 weeks, in 48 sessions, each lasting 35 minutes. The programme of physical exercises for developing basic motor skills was designed in line with the criteria set for the contemporary forms of kinesiological transformations for the preschool children and harmonised with physiological aspects according to respondents' age and individual characteristics of their anthropological status. The research results indicate that, in the final measurement, the differences between the sexes went in favour of boys in terms of the lower average values of the volume and body mass, subcutaneous adipose tissue on the back and body mass index. It was also determined that the additional kinesiology program of activities, regardless of the sex of pupils, had also given good results in terms of the reduction of the subcutaneous adipose tissue, as well as the volume and body mass of children. Furthermore, the testing of the selected sample showed that the growth of long bones was faster and more expressed among the boys than girls of the same height. The previous research (Kromeyer-Hauschild et al., 2012; Pelemiš et al., 2015) indicated that girls of this age have more subcutaneous adipose tissue, and that adipose tissue defines the level of nutrition. Although there were no differences in the level of adipose tissue among the children in the tested sample, except for the adipose tissue on the back, the girls had more adipose tissue because they were slightly shorter and heavier than the boys and their BMI levels were higher. Obviously, growth and development, in combination with additional physical exercise, brought about certain changes at morphological level. The findings are supported by the research which also included additional programme of physical exercise and where the reduction of body fat and body volume and mass was higher than in groups without this type of programme (Pelemiš, 2012; Adamo et al., 2014). The authors believe that a regular program of physical education in preschool institutions is insufficient for the preparatory preschool group. As the application of a six-month experimental programme of physical exercise represents a cybernetic model, the authors recommend it as a non-institutional form of physical education. The research results demonstrate the effect of an experiment which involved reduced values of hypothetical morphological factors of subcutaneous adipose tissue and, to an extent, body mass and volume.

**Keywords:** experimental treatment, morphological characteristics, preparatory preschool groups.

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