

ORGANIZED PHYSICAL ACTIVITIES INFLUENCE ON PRESCHOOL CHILDREN'S BMI

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ABSTRACT. *Background.* Physical development is a dynamic action with multifactorial determination that depends on hereditary heritage, environmental features and other factors such as food quality, the usual daily bodily activities and organized physical activities, living conditions (housing, income, educational level, level of granted care, etc). *Aims.* The influence of organized physical activities on 7 years old preschool children's BMI was studied. *Materials și methods.* Forty-eight (48) 7 years old children from Cluj-Napoca, participating in a physical activities focused Sommer School, were divided into 4 groups as follows: Group B(OPhA) – boys who have practiced for at least one year, at least twice a week, organized physical activities, n =16; Group B – boys who have not practiced organized physical activities, n =12; Group G(OPhA) - girls who have practiced for at least one year, at least twice a week, organized physical activities, n =10; Group G –girls who have not practiced organized physical activities, n =10. Height and weight were evaluated, than body mass index was calculated. *Results.* Significant lower BMI value was found in Group G(OPhA) compared to Group G. In Group B(OPhA), 12.5% of the boys were overweight and 6.25% were obese; in Group B, 25% of the boys were overweight and 25% were obese; in Group G(OPhA), there were no overweight or obese girls; in Group G, 20% of the girls were overweight and 10% were obese. *Conclusions.* Practicing organized physical activities determined highly significant lower BMI in girls groups; practicing organized physical activities did not influence BMI in boys groups.

Key words: preschool children, BMI, organized physical activities.

REZUMAT. *Introducere.* Dezvoltarea fizică este o acțiune dinamică, cu determinare multifactorială, care depinde de patrimoniul ereditar, particularitățile de mediu și de o serie de factori cum sunt: calitatea alimentației, nivelul activităților corporale zilnice uzuale și al activităților fizice organizate, condiții de viață (locuință, venituri, nivel educațional, nivel de îngrijire acordat etc). *Obiective.*

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S-a studiat influența activităților fizice organizate asupra indicelui de masă corporală la copiii preșcolari, cu vârsta de 7 ani. *Materiale și metode.* La acest studiu au participat 48 copii cu vârsta de 7 ani care au fost împărțiți în 4 loturi, după cum urmează: Lotul B(OPhA) – băieți care practicau de cel puțin un an, de cel puțin 2 ori pe săptămână, activități fizice organizate, n =16; Lotul B - băieți care nu practicau activități fizice organizate, n =12; Lotul G(OPhA) - fete care practicau de cel puțin un an, de cel puțin 2 ori pe săptămână, activități fizice organizate, n =10; Lotul G - fete care nu practicau activități fizice organizate, n =10. Parametrii somatometrici luați în considerare sunt: greutatea și talia, pe baza cărora s-a calculat indicele de masă corporală. *Rezultate.* Valoarea indicelui de masă corporală este înalt semnificativ mai mică pentru grupul de fete care practică activități fizice organizate, față de grupul care nu practică activități fizice organizate ($p=0.002$). În Grupul B(OPhA), 12.5% dintre băieți sunt supraponderali și 6.25% sunt obezi; în Grupul B, 25% dintre băieți sunt supraponderali și 25% sunt obezi; în Grupul G(OPhA) nu sunt fete supraponderale sau obeze; în grupul G, 20% dintre fete sunt supraponderale și 10% sunt obeze. *Concluzii:* În grupul de fete care practică activități fizice organizate, indicele de masă corporală este înalt semnificativ mai mic decât în grupul fetelor care nu practică activități fizice organizate; practicarea activităților fizice organizate nu a influențat valoarea indicelui de masă corporală în rândul băieților.

Cuvinte cheie: preșcolari, IMC, activitate fizică organizată.

Background

This paper is part of a larger study on growth parameters and physical development of school and preschool age children. Physical development is a dynamic action with multifactorial determination that depends on hereditary heritage, environmental features and other factors such as food quality, the usual daily bodily activities and organized physical activities, living conditions (housing, income, educational level, level of granted care, etc.)

Aims

The influence of organized physical activities on 7 years old preschool children's BMI was studied.

Materials și methods

Forty-eight (48) 7 years old children from Cluj-Napoca were evaluated. 28 were boys and 20 were girls.

a) Groups

Groups were divided as follows:

Group B(OPhA) – 7 years old boys who have practiced for at least one year, at least twice a week, organized physical activities, n =16;

Group B – 7 years old boys, who have not practiced organized physical activities, n =12;

Group G(OPhA) - 7 years old girls who have practiced for at least one year, at least twice a week, organized physical activities, n =10;

Group G – 7 years old girls who have not practiced organized physical activities, n =10.

b) Methods

Height and weight were evaluated, rigorously following the measurement methodology (Ionescu, 1994). Measurements were scheduled between 8-12 am, in order to avoid diurnal variations of height. Students were scantily clad and barefoot.

Body mass index (BMI) was obtained by calculating BMI value as follows:

$BMI = \text{Weight (kilograms)} / \text{Height}^2 \text{ (meters)}$. Normal values for 7 years old children are between 13.7 kg/m² and 17.4 kg/m² for boys and between 13.4 kg/m² and 17.6 kg/m² for girls; BMI's values between 17.4 kg/m² and 19.1 kg/m² for boys and between 13.6 kg/m² and 19.7 kg/m² for girls means overweight; BMI's values higher than 19.1 kg/m² for boys and 19.7 kg/m² for girls means obesity (www.cdc.gov).

Statistical analysis was performed with Microsoft Excel 2007. Significance threshold was set at p<0.05.

Results

Significant lower BMI value was found in Group G(OPhA) compared to Group B (Table 1, Fig. 1).

Table 1.

Comparative statistical analysis of BMI in boys and girls

Groups	Mean	Std. dev.	p
Group B(OPhA)	15.92	1.67	0.14
Group B	17.21	2.41	
Group G(OPhA)	14.80	0.91	0.002
Group G	17.12	1.62	

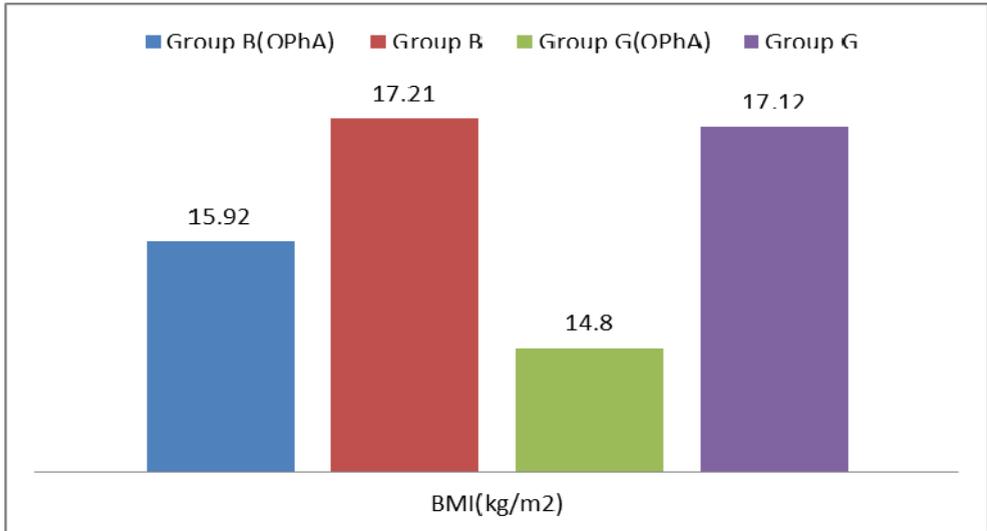


Fig. 1. BMI in boys and girls groups

In Group B(OPhA), 12.5% of the boys were overweight and 6.25% were obese; in Group B, 25% of the boys were overweight and 25% were obese; in Group G(OPhA), there were no overweight or obese girls; in Group G, 20% of the girls were overweight and 10% were obese (Fig. 2).

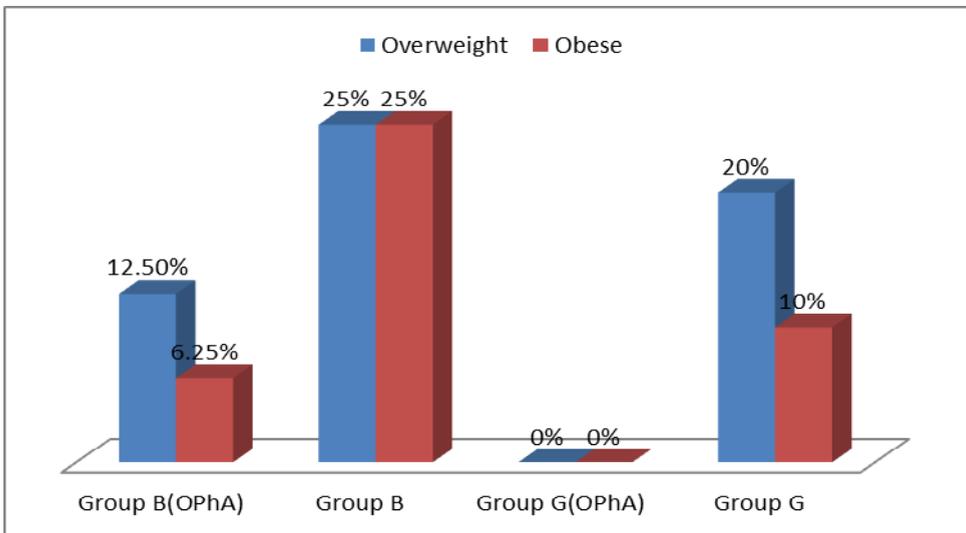


Fig. 2. Percentage of overweight and obese subjects in each group

Discussion

Childhood obesity has become a global public health issue, therefore researches are conducted in order to identify its determinants in different populations. After extensive research, several factors that influence physical development of children were identified. Among these factors, physical activity and organized physical activity are playing a very important role.

Obesity prevalence among school children in Cluj-Napoca city is 8.29% and overweight prevalence is of 12.84% placing Romania as one of the countries with an average prevalence of obesity, being significantly greater in males than in females for both overweight and obesity. The highest prevalence is among the 6-10 years group, and the lowest prevalence among teenagers (Vălean et al., 2009).

Our study, as shown in Fig.2, reveals similar results: the prevalence of overweight and obese children is higher among boys than girls. However, the BMI is not significantly higher in Group B, compared to Group B(OPhA) ($p=0.14$) and is highly significant lower in Group G(OPhA) compared to Group G ($p=0.002$). A Danish study among primary school children shows that significant lower participation in club sports did not affect overall physical activity level (Nielsen et al., 2013). This may be the situation in our case, if we consider the fact that the subjects in this study were participating in a physical activities focused Summer School.

We intent to continue the researches started in this study in order to identify the influence of the other factors (parents education level, family income, parents BMI, physical activities, eating patterns, screen-time) on preschool children's BMI.

Socio-economic status (SES) is one of the many factors that influence the child's physical development. Thibault et al. (2012) demonstrated that low SES is associated with a higher risk of being overweight or obese. These findings are sustained by Lane et al. (2012), while a study from Belarus shows that more affluent children and their fathers were more likely to be overweight/obese but the reverse was found for mothers (Patel et al., 2012) and other study from Iran shows a higher prevalence of obesity in the children with good socio-economic status and a positive relationship between usage of fast food and obesity (Behzadnia et al., 2012).

Further more, some factors that influence physical development are determined by SES. Thereby, low SES children have lower physical activities levels, higher BMI and spend more time in sedentary behavior, compared to high SES children (Drenowatz et al., 2010). Magnusson et al. (2011) highlights that

eating breakfast and vegetables and physical activity were higher and screen-time(watching TV and playing computer games) and obesity prevalence was lower in high SES children, compared to low SES children. Wang et al. (2012) concluded that excessive TV viewing might increase the risk of obesity among Chinese youth.

Nutritional patterns and its influence on children's physical development were also studied by Weijs et al. (2011), who concluded that a high intake of sugar containing beverages as well as animal protein in the first year of life may increase the risk of overweight at 8 years. Inactivity (watching TV and playing computer games) was inversely associated with "healthy patterns" in all age and sex groups and positively associated with "unhealthy snacks" (Craig et al., 2010).

Parents are responsible not only for the genetic inheritance of their children, but also for passing onto them their behaviors and attitudes toward life. Thereby, parent's obesity seem to influence the prevalence of overweight and obesity in children (Lazzeri et al., 2011). Normal BMI status of the parents seemed to have a protective effect on the likelihood of having an overweight/obese child (Farajian et al., 2012). Juresa et al. (2012) describes a overweight/obese child profile: high educated parents, eat less vegetables and fruits, spend more time playing computer games, have less physical activity. A study conducted among Polish children concluded that parents educational level influence child's physical development (Suliga, 2010). Thereby, interventional plans conducted in order to reduce BMI and increase physical activity level were more successful among children with degree level educated parents (Au & Yu, 2012) and among children of high SES families (Plachta-Danielzik et al., 2011).

Conclusions

1. Practicing organized physical activities determined highly significant lower BMI in girls groups
2. Practicing organized physical activities did not influence BMI in boys groups.

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*** <http://www.cdc.gov/growthcharts/data/set2/chart-15.pdf>

*** <http://www.cdc.gov/growthcharts/data/set2/chart-16.pdf>