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Original article

THE POSITIVE EFFECTS OF PRACTICING FITNESS ON THE BODY COMPOSITION OF SECONDARY SCHOOL STUDENTS

GIDU DIANA VICTORIA[1], IBRAHIM ALIAA ABDELMONEIM [2], AHMED NANA ELDAWY[3], OLTEAN ANTOANELA[1], CONSTANTINESCU OANA VERONA[4], PARASCHIV PETRONELA[5], CALOTĂ NICOLETA DANIELA[1]

Abstract

Aim. This study highlighted the positive effects of practicing fitness on the body composition of secondary school students.

Methods. At experiment participated 31 schoolchildren (female N =12 and male N=19) aged between 12 and 13 years old. The tests used to highlight the positive effects of fitness in the students were: push-ups, abs and the body fat percentage. The experimental group performed a training program with specific from fitness, for 10 minutes, twice a week, for 3 months.

Results. The analysis of the data at the final test shows us that in 4 of the 5 parameters tested, the experimental group obtained significantly better results than the control group. These differences are primarily due to the fitness program used in the preparation of the experimental group.

Conclusions. Based on the results and the statistical analysis, we can conclude that the introduction of a weekly program of fitness exercises for obese children will lead to positive effects regarding their weight loss.

Keywords: obesity, schoolchildren, fitness, weight loss.

Introduction

Obesity prevention has become a global public health priority because, internationally, the prevalence of childhood obesity continues to increase (Olds, Maher, Zumin et al, (2011). Scientific evidence shows that once obesity has been established, it is difficult to return to a normal weight through lifestyle interventions.

In order to combat and prevent obesity from an early age, it is necessary to have programs in school to inform students, parents, and teachers about the risks that this "disease" entails. A major cause of the appearance of excess weight from such a young age is the lack of exercise, associated with an unhealthy diet. Thus, it is important to know that physical activity contributes to daily energy consumption and is important for maintaining a healthy body weight throughout growth. Since childhood obesity started to be a problem including in our country, the attention of specialists in the field turned to this aspect. As it is also shown in the specialized literature, one of the most common, effective and handy ways to fight extra-kilos remains the motor factor.

Most specialists in the field believe that this increase in obesity globally is due to the increase in energy intake and the decrease in physical activity (Livingstone M.B., 2001; Grier, S.A., Mensinger, J., et all, 2007, Ungureanu, A., 2018, Gidu et al, 2024). As Allan, K., Burridge, K., (2006) showed that, in recent years there has been an alarming increase in the incidence and prevalence of obesity in children and young people. Therefore, specialists in this field must emphasize the multiple influences that physical activity can have on the individual's life.

Tudor-Locke et al. (2004) investigated the relationship between the number of daily steps and body composition in children aged 6 to 12 years. The results showed that girls who took less than 12,000 steps/day and boys who took less than 15,000 steps/day were more likely to be overweight or obese. When the number of steps/day was translated into time spent in physical activity, the data showed that those children participating less than 120 min/day (girls) and less than 150 min/day (boys) were more likely to be overweight.

Sgro et al (2009) explored the effect of duration of resistance training on body composition in children aged 7–12 years training 3 times per week for 8, 16 or 24 weeks. The results indicated an improvement in the children's body

[1] Faculty of Physical Education and Sport,"Ovidius" University from Constanta, Bd Mamaia no 124, Romania; Corresponding author: campiap@yahoo.com;
[2] Fayoum University at Early Childhood Education, Egypt, aliaa.smsm@gmail.com, aai04@fayoum.edu;
[3] Faculty of physical education for girls, Helwan University, Egypt;
[4] Technical University of Civil Engineering of Bucharest, flipper602@yahoo.com;
[5] Gheorghe Asachi Technical University of Iași, petrouti@yahoo.com.

composition after 8 weeks of training, with a 5 to 7% reduction in body fat, while this was decreased by approximately 8.1% after 16 weeks of intervention.

Starting from this concept of physical education, fitness comes as a complement, representing the ability to achieve an optimal quality of life. As Statache, F., (2012) considered that the level of fitness differs depending on the objectives of each age category, but also on the level of training.

Fitness is a real help for people suffering from obesity, which is not only an aesthetic problem, but also a widespread nutritional and metabolic disorder, characterized by weight gain above the ideal weight level, with multiple consequences on health status.

Fitness combines various exercises and acts on the body as a whole. Practicing fitness allows the achievement of certain objectives, such as toning the muscles and strengthening the whole body, remodeling the silhouette and gaining suppleness (Dorgan V., Liușnea C.Ș., Gheorghiu A., 2016, Nae IC, 2011).

It is not news that among people who suffer from obesity and want to lose weight, sports should not be neglected. Sport, particularly fitness, is a healthy and extremely effective way to combat obesity.

We believe that sustained physical activity—such as a rigorous fitness program—may benefit children who are obese by increasing lean body mass, increasing energy expenditure, improving appetite control and energy intake, and improving metabolism. Regardless of the weight-related effects, the above changes justify promoting fitness in children.

In addition, we believe that the use of fitness programs for obese 13-14-year-old students necessary because their work regime is frequently characterized by sedentarism, reduced mobility, invariable working position during 8-10 hours. As a result, physical exercises represent an important factor that will lead to counteracting the negative consequences of lack of movement (Ungureanu, 2018, Gidu el al, 2022).

Methods

The experiment took place between October 2023 and April 2024, during approximately 6 months, in the sports hall of Valul lui Traian General School, Constanta.

The participants of the experiment were 31 students - 12 girls and 19 boys, aged between 12 and 14, students of Valul lui Traian General School, Constanta. Following the results of the somato-motor tests, the participants were divided into an experimental group (N = 14) and a control group (N = 17). The students were informed about the experiment and all their guardians agreed to the children's voluntary participation and signed an agreement in this regard. The identification data of the subjects are presented in table no.1.

Table no. 1. Data of the subjects

Subjects	Age (years)	Height (cm)	Weight (kg)
Experimental group (N = 14)	12.64 ± 0.49	164.79 ± 8.37	63.07 ± 11.95
Control group (N = 17)	13.17 ± 0.39	160.94 ± 10.38	65.17 ± 9.72

At the somatic level, the following milestones were recorded:

- body height (waist - cm) measured using the tallimeter;
- body weight (kg) - was measured using a classic medical scale.
- adipose tissue percentage/ body composition - skin folds (Jackson/Pollock method with 4 folds - abdominal, thigh, brachial and suprailiac triceps folds were collected). The percentage of adipose tissue was measured using a caliper - "Plicometer fitness fat caliper"

The physical parameters recorded were:

- strength of the upper limbs - push-ups (number of push-ups in 60 seconds)
- abdominal strength – sit-ups (number of sit-ups in 60 seconds).

In the statistical analysis of the data, we considered the minimum threshold of significance for $p = 0.05$.

Results

The monitored somatic parameters were: waist, weight and percentage of adipose tissue (Table no. 2). And from a motor point of view, the following indexes were targeted: the strength of the muscles of the upper limbs and the strength of the abdominal muscles (Table no. 3).

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Table no. 2. The somatic parameters of the tested students (N = 31; X ± DS)

Subjects	Parameters					
	Height (cm)		Weight (kg)		Percentage of adipose tissue (%)	
	Ti	Tf	Ti	Tf	Ti	Tf
Experimental group (N = 14)	164.79 ± 8.37	164.79 ± 8.37	63.07 ± 11.95	59.00 ± 9.79	23.86 ± 6.52	21.35 ± 6.95
Control group (N = 17)	160.94 ± 10.38	160.94 ± 10.38	65.17 ± 9.72	64.52 ± 9.36	23.92 ± 5.28	22.78 ± 5.20
t	1.141	1.141	0.530	2.595	1.194	2.248
p	p > 0.05	p > 0.05	p > 0.05	p < 0.05	p > 0.05	p < 0.05

The statistical analysis of the data showed that the recorded values were substantially equal in all the subjects participating in the experiment, in all the parameters tested, the differences between the averages being insignificant, as can be seen in table no.1.

The motor parameters tested are presented in table no. 3.

Table no.3. The motor parameters of the tested students (N = 31; X ± DS)

Subjects	Parameters			
	Push-up (no. rep./ 1')		Crunch (no rep./ 1')	
	Ti	Tf	Ti	Tf
Experimental group (N = 14)	7.50 ± 1.09	13.85 ± 1.99	13.21 ± 1.76	22.57 ± 2.20
Control group (N = 17)	7.05 ± 0.96	11.05 ± 0.74	12.82 ± 1.33	15.35 ± 1.27
t	1.178	4.97	0.683	5.830
p	p > 0.05	p < 0.05	p > 0.05	p < 0.05

Discussions

The percentage of adipose tissues

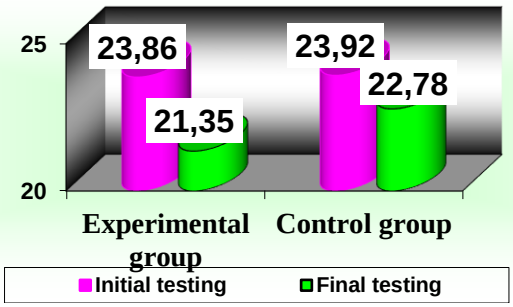

Figure 1. The values recorded in the index "percentage of adipose tissue"

The experimental group had an average of 21.35 ± 6.52 %, and the control group 22.78 ± 5.28 %. The statistical analysis showed that in this sample, the experimental group had significantly better results than the control group (t = 2.248, p < 0.05).

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In the control group, no significant differences were observed between the two tests. Other authors found similar results, concluding that after a period of controlled and regular physical effort, obese children recorded weight decreases, highlighted by decreases in fat percentages (Livingstone M.B., 2001; Addo Y, Himes J., 2010; Mocanu V, et al., 2011; Puhl R., M., Luedicke, J., Heuer, C., 2011).

Strength of the upper limbs - push-ups

In this test, in the final testing, the experimental group obtained an average of 13.85 ± 1.99 push-ups, and the control group 11.05 ± 0.74 push-ups. For this parameter, statistical analysis of the data from the final test demonstrated that the experimental group obtained significantly better results than the control group ($t = 4.97$, $p < 0.05$). Within the experimental group, significant differences are also recorded between the initial and final testing ($t = 5.630$, $p < 0.05$).

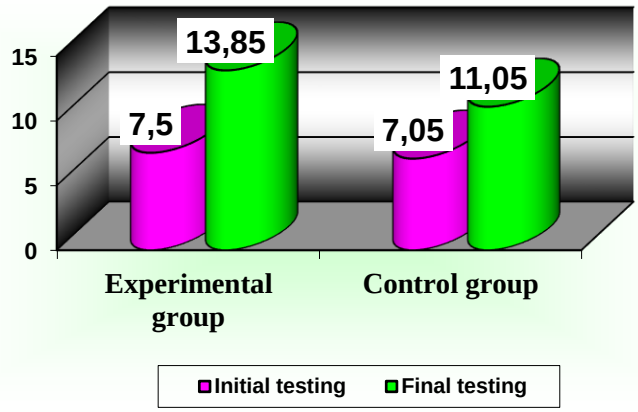

Figure 2. The values recorded for the upper limb force parameter - push-ups

Abdominal strength – sit-ups

For the "sit-ups" parameter, the recorded values are as follows: in the experimental group, 22.57 ± 2.20 lifts and in the control group 15.35 ± 1.27 lifts. The statistical analysis showed that between the two groups the differences were significant ($t = 5.723$, $p < 0.001$) – fig. no. 3.

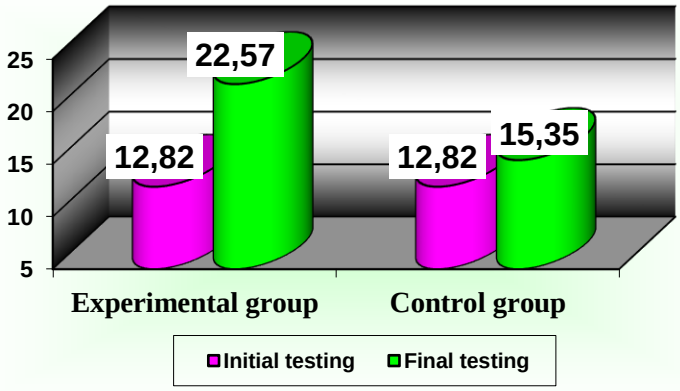

Figure 3. The values recorded for the parameter sit-ups

The experimental group registered significant values for this parameter at the final test compared to the initial test, whereas the control group did not. We believe that this fact is due to the fitness program used during the experiment. Although they did not use this type of fitness training, other authors also found that a fitness program has positive effects on increasing strength in the abdominal muscles (Piras A, Persiani M, et all., 2015; Dorgan V. Et all. , 2016; Hangu, S.Ș., 2016). Based on the statistical analysis of the data from the final testing, the idea emerges that, for all tested parameters, the experimental group obtained significantly better results than the control group. Certainly, these differences are due to the training program implemented in the experimental group.

Conclusions

Following the application of the experimental program and the statistical analysis of the obtained results, the following were found:

During the initial testing, the values of somatic parameters obtained by the two groups were not significantly different from a statistical point of view ($p>0.05$). In the tests of general motor skills, the comparative analysis between the initial and final testing showed significant progress ($p < 0.05$) in the experimental group in all tests.

The control group did not achieve significant progress between the initial testing and the final testing ($p > 0.05$) in motor parameters. In the experimental group, the percentage of adipose tissue decreased significantly at the final test compared to the initial one, while in the control group, this fact was not recorded. The application of the specially designed training program led to significantly better results in the experimental group.

Based on the results and statistical analysis, we can state that the working hypothesis has been verified; the proposed fitness program has achieved the purpose for which it was designed. Thus, we can claim that the introduction of a weekly program of fitness exercises for obese children can have positive effects on weight loss.

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