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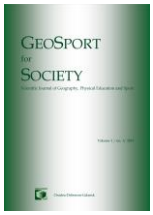

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Benefits of recreational physical activity in 6-9 year old children: impact on body composition and motor skills

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Abstract: Optimally developed body composition and motor skills make an important contribution to increasing quality of life and also determine sports performance. The aim of this study was to analyze the influence of recreational contemporary dance training on body composition and the level of motor skills development in 6-9 year old children. The subjects of the study were 26 girls aged 6-9 years, 12 of whom were in the experimental group (EG) and 14 in the control group (CG). The EG participated in contemporary dance training for 6 months, twice a week, one hour each, and the CG did not perform any extracurricular physical activity. Body mass index (BMI), body fat (BF) and skeletal muscle (SM) were analyzed with OMRON BF511 monitor. The motor skills assessment tests were: standing board jump (SBJ), Matorin test (MatT), back saver sit & reach with alternatively reached legs (S&R_RL – right leg reached, S&R_LL – left leg reached) and sit-ups (S-U). Data were processed with SPSS 20 software. Statistically significant differences between initial and final values were found for body composition in the experimental group for the parameter SM ($p = .000$), and in the control group for SM ($p = .004$), but also for BF ($p = .053$) on CG. In the motor skills assessment tests, in the experimental group the differences were statistically significant for all parameters assessed ($p \leq .05$), and in the control group only for S&R_RL ($p = .007$) and , S&R_LL ($p = .005$), but with smaller effects size. In conclusion, contemporary dance practiced for 6 months, twice a week, has no impact on body composition, but may influence the development of specific motor skills.

Keywords: body composition, bioelectrical impedance analysis, motor skills, contemporary dance, 6-9 year-old girls

Introduction

Regular participation in physical activity is positively associated with high physical, mental and emotional health (Penedo and Dahn, 2005). For the prevention of obesity and disease, prolonged maintenance of well-being and the formation of a healthy lifestyle, participation in physical activity from childhood is recommended (Novotná and Slováková, 2016; Dascal and Buruiană, 2020; Slováková et al., 2022).

Acker et al. (2012), suggest that among children it is necessary to exercise 3-5 times a week, one hour each. In Romanian pre-university education, 2 hours per week of physical education and sport are provided for primary school pupils, which is why it is recommended that they participate in physical activities in their free time (Bocu, 2010). A physical activity that can be practiced both as a performance sport activity and as a recreational activity for socialization, entertainment, well-being, externalization, etc., is dancing (Graham, 2002; Malkogeorgos et al., 2011).

Organised exercise in the form of dance is an attractive way for children and can bring many benefits to their development. Some benefits are improved cognitive, emotional and social skills, increased well-being and better somatic self-control (Eddy, 2009; Connolly et al., 2011; Burkhardt and Brennan, 2012; Payne and Costas, 2021). However, for dance to be practiced with a high degree of satisfaction it is essential to develop motor skills (Roche and Huddy, 2015).

In children, motor skills develop without intervention until a certain age, but constant exercise helps to improve them (Cârstea, 2000; Leon, 2010). According to Săvescu (2007), optimally developed motor qualities are essential for the effective learning of movement skills. At the same time, the practice of the assimilated skills contributes to the development of motor skills, which means that they are mutually related and dependent on each other.

According to the literature of specilaity, the practice of physical exercise through dance contributes to the development of motor qualities specific to the dance style, but also to harmonious physical development (Burkhardt and Brennan, 2012; Cosma et al., 2016; Franklin, 2017).

The aim of this study was to examine the impact of recreational contemporary dance training on body composition and the development of specific motor skills in 6-9 year old beginner girls.

This research started from the following hypotheses:

- H_1: contemporary dance practiced as a recreational activity will significantly influence the body composition of 6 - 9 year old girls;
- $H_{2:}$ recreational contemporary dance will significantly contribute to the development of motor skills in 6-9 year old girls.

Materials and Methods

Our study included 26 female children aged 6 to 9 years, of whom 12 were in the experimental group and 14 in the control group. Subjects in the experimental group participated in recreational contemporary dance lessons twice a week for one hour for 6 months out of school, while those in the control group exercised only in physical education and sports classes at school.

The content of the training was different for the two days of the week, except for the first and last part of the lesson. Each workout started with preparing the body for the effort, which was performed to music and in sync, after which exercises were performed to develop flexibility. At the end of the lessons, body movements were performed to different musical rhythms according to each child's own imagination, followed by a relaxing stretch.

After the flexibility exercises, ballet movements were performed in the first workout, and in the second training these were replaced with acrobatic elements from gymnastics. Throughout the lesson, emphasis was placed on performing the exercises correctly and they were adapted to the level of training of the subjects. The intensity of the workouts was low in the first week's workout and moderate in the second, and their complexity was moderate to high. Before and after the application of the intervention program, body composition and motor skills development were measured.

Body composition was assessed by measuring body mass index (BMI), body fat (BF) and skeletal muscle (SM) using the OMRON BF511 monitor (Figure 1), which is clinically validated for use in individuals over 6 years of age and weighing less than 150 kg (OMRON, f. d.). It has 8 sensors and works on the principle of bioelectrical impedance analysis, which consists of calculating body composition based on the resistance of tissues to the passage of an electric current through the body (Cosoveanu and Bulucea, 2011; Beaudart et al., 2020).

Figure 1. Body composition assessment monitor - OMORON BF511

The level of development of motor skills was measured by the following tests: the standing board jump (SBJ) for lower limbs explosive strength, the Matorin test (MatT) for coordination, the logitudinal trunk flexion with the right (S&R_RL) and left (S&R_LL) leg alternately extended forward to assess flexibility, and the crunches (S-U) for 1 minute to check the strength of the abdominal muscles.

Data were statistically analysed with SPSS version 20 software, performing descriptive analysis, checking data distribution and comparing means on the variables analysed.

Results

The distribution of the data was checked using the Shapiro-Wilk test and the data were normally distributed, and parametric tests were used for analysis.

To compare initial values of body composition parameters and motor skills for the experimental and control groups, the independent samples t-test was performed. No statistically significant differences were found between the means of the two groups, except for the parameters S&R_RL (t (19.40) = 4.04, p = .001) and S&R_LL (t (19) = 4.15, p = .001). These results suggest that EG and CG were homogeneous at the beginning of the study in both body composition and motor skills development, except for flexibility.

Table 1. Comparison of means for body composition parameters at measurements 1 and 2 for the experimental group - Paired Samples T-Test

Pair	Variable	UM	Mean	SD	t	df	Sig. (2-tailed)	Size effect (d)
1	BMI_M1 BMI_M2	kg/ cm^2	18.19 18.08	2.85 2.88	-.52	11	.615	-
2	BF_ M1 BF_ M2	%	24.10 22.53	7.05 6.59	-2.10	11	.060	-
3	SM_M1 SM_M2	%	27.89 29.69	2.10 1.71	7.23	11	.000	2.09

Comparison of means from the first and second measurements of body composition parameters was performed with paired samples t-test. According to the results in Tables 1 and 2, the means of the BMI parameter did not show statistically significant differences following the intervention program in the experimental group [t(11) = -.52, p = .615], but neither in the control group [t(13) = -1.23, p = . 243], whereas the values of the SM parameter increased statistically significantly in both groups: in the experimental group [t(11) = 7.23, p = .00, d = 2.09] respectively in the control one [t(14) = 3.55, p = .004, d = .95], the effect size being large in both. The difference in means between initial and final measurements for the parameter BF was statistically significant only in the control group (p = .05). These results suggest that the intervention program did not influence subjects body composition.

Paired t-test was performed to compare the means of the first and second measurements for the motor skills parameter in EG (Table 3) and CG (Table 4). In the experimental group, statistically significant differences were found between the initial and final values for all parameters analysed, but in the control group statistically significant differences were found only for the parameters S&R_RL [t (13) = 3.2, p = .007] and S&R_LL [t (13) = 3.34, p = .005], the effect size being large for both variables.

Table 2. Paired Samples T-Test for body composition parameters at measurements 1 and 2 for the control group

Pair	Variable	UM	Mean	SD	t	df	Sig. (2-tailed)	Size effect (d)
1	BMI_M1 BMI_M2	kg/ cm^2	19.14 18.92	3.98 4.26	-1.22	13	.243	-
2	BF_ M1 BF_ M2	%	25.16 23.94	10.56 11.12	-2.13	13	.053	-.57
3	SM_M1 SM_M2	%	28.19 29.18	1.74 1.77	3.55	13	.004	.95

Table 3. Paired Samples t-test for motor skills parameters at measurements 1 and 2 for the experimental group

Pair	Variable	UM	Mean	SD	t	df	Sig. (2-tailed)	Size effect (d)
1	SBJ_M1 SBJ_M2	cm	87.25 100.33	13.30 12.62	2.80	11	.017	.81
2	MatT_M1 MatT_M2	degrees	195.00 244.58	20.67 56.14	3.1	11	.010	.90
3	S&R_RL _M1 S&R_RL _M2	cm	6.50 13.08	3.68 2.43	4.7	11	.001	1.37
4	S&R_LL _M1 S&R_LL _M2	cm	6.08 13.25	3.48 2.34	6.60	11	.000	1.91
5	S-U_M1 S-U_M2	nr	14.17 24.67	6.69 6.81	3.8	11	.003	1.08

Table 4. Paired Samples t-test for motor skills parameters at measurements 1 and 2 for the control group

Pair	Variable	UM	Mean	SD	t	df	Sig. (2-tailed)	Size effect (d)
1	SBJ_M1 SBJ_M2	cm	79.71 86.71	15.81 14.97	1.95	13	.073	-
2	MatT_M1 MatT_M2	degree s	195.00 198.93	32.29 30.39	0.4	13	.714	-
3	S&R_RL _M1 S&R_RL _M2	cm	-2.71 0.14	7.56 4.59	3.2	13	.007	.85
4	S&R_LL _M1 S&R_LL _M2	cm	-3.14 0.29	7.42 4.29	3.34	13	.005	.89
5	S-U_M1 S-U_M2	nr	12.14 13.79	6.04 7.95	1.2	13	.238	-

These results suggest that in the control group only flexibility developed in the period between the two tests, but in the experimental group the intervention program influenced all the motor skills assessed.

Discussions

The literature states that physical activity positively influences children's body composition (Janz et al., 2009; Burkhardt and Brennan, 2012; Oliveira et al., 2015). From the results of our study, this is not apparent, as the percentage of body fat decreased following the practice of recreational contemporary dance, but the changes were higher in subjects who did not participate in leisure time physical activities. Also, skeletal muscles and body mass index showed similar evolution for both groups, which means that the changes occurred in the subjects of the experimental group are not due to the applied program.

Among the factors that can cause anthropometric changes in young school-age children, we mention those of genetic nature, nutrition, environment, ethnicity, fluctuations in growth period, etc. (Huang et al., 2001; Mihăilă et al., 2010; Demerath and Johnson, 2013). At the same time, the results may also be influenced by the small number of subjects participating in the study.

Therefore, practicing recreational contemporary dance for 6 months did not influence the body composition of the study participants, which leads us to reject hypothesis I-a of the research.

In terms of the impact of the intervention programme on the development of motor skills, the results suggest that it was positive. For example, abdominal and lower limb explosive strength increased in both groups. According to Roman (2008) and Șerbescu (2008), muscle strength increases with age among children. Falk et al. (2002) also suggest that it improves if muscle mass increases and fat tissue decreases. Subjects in this study showed similar changes in body composition, and this could be a reason for the increased muscle strength in the two tests for EG and CG. However, only the experimental group showed statistically significant differences between initial and final mean values, meaning that the intervention program had a positive impact on strength development.

The coordination ability improved in both groups, according to the results of the Matorin test, but the differences were statistically insignificant in the control group, therefore we consider that contemporary dance training had a positive effect on coordination in EG. The progress of the control group can be explained by the fact that it develops with the maturation of the central nervous system, therefore with increasing age (Bompa, 2002; Roman, 2009).

Regarding flexibility, the literature suggests that it is a motor skill that develops easily between 6 and 11 years of age (Balyi and Hamilton, 2004; Lloyd and Oliver, 2012; Donti et al., 2022). Given that the subjects of our study correspond to this age period it was expected to identify statistically significant differences between initial and final values in both groups. However, the effect was higher in the experimental group, as a result we believe that the intervention program had an impact on flexibility, and that the control group changes may be due to the exercise practiced in school physical education classes.

The analysis of the recorded results leads us to state that hypothesis II of the research is accepted.

Conclusions

The recorded results partially confirm the first research hypothesis, suggesting that recreational contemporary dance training has no impact on children's body composition, but may have a positive influence on muscle mass development.

Concerning the second hypothesis, the results show that the intervention programme can contribute to the development of motor qualities strength (in abdominal muscles and lower limb explosive strength), coordination and flexibility. The last one was also developed in the control group, but the effect was higher in the experimental group.

In conclusion, recreational contemporary dance practised by 6-9 year old girls for 6 months, twice a week influences the development of specific motor skills, but has no impact on body composition.

Limitations

We believe that this research was limited by the small number of subjects and the short period of implementation of the intervention program.

References

Acker, R.V., Bourdeaudhuu, I.D., Martelaer, K.D., Seghers, J., Cocker, K.D., & Cardon, G. (2012). The association between socio-ecological factors and having an after-school physical activity program. *Journal of school health*, 82(9), 395-403.

Balyi, I., & Hamilton, A. (2004). Long-term athlete development: Trainability in childhood and adolescence. *Olympic coach*, 16(1), 4-9.

Beaudart, C., Bruyère, O., Geerinck, A., Hajaoui, M., Scafoglieri, A., Perkisas, S., Bautmans, I., Gielen, E., Reginster, J-Y., & Buckinx, F. (2020). Equation models developed with bioelectric impedance analysis tools to assess muscle mass: A systematic review. *Clinical nutrition ESPEN*, *35*, 47-62. https://doi.org/10.1016/j.clnesp.2019.09.012

Bocu, T. (2010). Repere vizând îmbunătăţirea sănătăţii populaţiei şcolare prin activităţi de educaţie fizică şi sport [*Highlights for improving school health through physical education and sports activities*]. *Palestrica mileniului III*, 7.

Bompa, T. (2002). *Periodizarea: Teoria şi metodica antrenamentului [Periodization: Training Theory and Methodology]*. Editura Ex Ponto, Constanta, Romania.

Burkhardt, J., & Brennan, C. (2012). The effects of recreational dance interventions on the health and well-being of children and young people: A systematic review. *Arts & Health*, 4(2), 148-161. https://doi.org/10.1080/17533015.2012.665810

Cârstea, G. (2000). *Teoria şi metodică educaţiei fizice şi sportului: Pentru examenele de definitvat şi gradul didactic II [Theory and methodology of physical education and sports: For final examinations and didactic degree II]*. Editura AN-DA, Romania.

Connolly, M.K., Quin, E., & Redding, E. (2011). Dance 4 your life: exploring the health and well-being implications of a contemporary dance intervention for female adolescents. *Research in Dance Education*, 12(1), 53-66. https://doi.org/10.1080/14647893.2011.561306

Cosma, G., Dragomir, M., Dumitru, R., Lică, E., & Gheţu, R. (2016). The dance impact on the motor ability in children. *Ovidius University Ann*als*, Series Physical Education & Sport/Science, Movement & Health*. Supplement, 16, 382-386.

Cosoveanu, S., & Bulucea, D. (2011). Obesity in children-an increasing pediatric issue. *Romanian Journal of Pediatrics*, 60(2).

Dascal, A., & Buruiană, V. (2020). Proiectarea activităţilor la Domeniul „Sănătate şi motricitate" în educaţie timpurie [Designing activities in the "Health and motor skills" field in early education]. *Managementul educaţional: realizări şi perspective de dezvoltare*, 283-288.

Demerath, E.W., & Johnson, W. (2013). Pediatric body composition references: what's missing?. *The American journal of clinical nutrition*, 98(1), 1-3. https://doi.org/10.3945/ajcn.113.064907

Donti, O., Konrad, A., Panidi, I., Dinas, P.C., & Bogdanis, G.C. (2022). Is There a "Window of Opportunity" for Flexibility Development in Youth? A Systematic Review with Meta-analysis. *Sports medicine-open,* 8(1), 1-24. https://doi.org/10.1186/s40798-022-00476-1

Eddy, M. (2009). A brief history of somatic practices and dance: Historical development of the field of somatic education and its relationship to dance. *Journal of Dance & Somatic Practices*, 1(1), 5-27. https://doi.org/10.1386/jdsp.1.1.5_1

Falk, B., Sadres, E., Constantini, N., Zigel, L., Lidor, R., & Eliakim, A. (2002). The association between adiposity and the response to resistance training among pre-and early-pubertal boys. *Journal of Pediatric Endocrinology and Metabolism*, 15(5), 597-606.

Franklin, E. (2017). *Conditioning for Dance: Training for Whole-body Coordination and Efficiency*. Human Kinetics.

Graham, S.F. (2002). Dance: A transformative occupation. *Journal of Occupational Science*, 9(3), 128-134. https://doi.org/10.1080/14427591.2002.9686500

Huang, T.T.K., Johnson, M.S., Figueroa-Colon, R., Dwyer, J.H., & Goran, M.I. (2001). Growth of visceral fat, subcutaneous abdominal fat, and total body fat in children. *Obesity research*, 9(5), 283-289. https://doi.org/10.1038/oby.2001.35

Janz, K.F., Kwon, S., Letuchy, E.M., Gilmore, J.M.E., Burns, T.L., Torner, J.C., Willing, M.C., & Levy, S.M. (2009). Sustained effect of early physical activity on body fat mass in older children. *American journal of preventive medicine*, 37(1), 35-40. https://doi.org/10.1016/j.amepre.2009.03.012

Leon, V. (2010). *Dezvoltarea calităţilor motrice cu ajutorul metodelor moderne şi a mijloacelor specifice jocului de fotbal, în învăţământul liceal [Development of motor skills with the help of modern methods and means specific to the football game, in high school education]*. Editura Sfântul Ierarh Nicolae, Braila-Galati, Romania.

Lloyd, R.S., & Oliver, J.L. (2012). The youth physical development model: A new approach to long-term athletic development. *Strength & Conditioning Journal*, 34(3), 61-72.

Malkogeorgos, A., Zaggelidou, E., Manolopoulos, E., & Zaggelidis, G. (2011). The social-psychological outcomes of dance practice: A review. *Sport Science Review*, 20(5-6), 105.

Mihăilă, R., Totoianu, Gh., I., Resiga, E., & Mihăilă, R. (2010). Dezvoltarea fizică – indicator al stării de sănătate la şcolari *[Physical development - indicator of health status in schoolchildren]*. *AMT*, II(2), 10.

Novotná, B., & Slováková, M. (2016). The current problem of school children-lack of physical activity. *European researcher. Series A*, 4, 231-238.

Oliveira, R.D., Teixeira, A.F, & Riberiro, M. (2015). Effects of a recreational physical activity summer camp on body composition, metabolic syndrome and physical fitness in obese children. *The Journal of Sports Medicine and Physical Fitness*, 56(7-8), 933-938.

OMRON (f. d.). Body Composition Monitor BF511 (HBF-511T-E/HBF-511B-E): Instruction Manual.

Payne, H., & Costas, B. (2021). Creative Dance as Experiential Learning in State Primary Education: The Potential Benefits for Children. *Journal of Experiential Education*, 44(3), 277–292. https://doi.org/10.1177/1053825920968

Penedo, F.J., & Dahn, J. R. (2005). Exercise and well-being: a review of mental and physical health benefits associated with physical activity. *Current opinion in psychiatry*, 18(2), 189-193.

Roche, J., & Huddy, A. (2015). Creative adaptations: integrating Feldenkrais principles in contemporary dance technique to facilitate the transition into tertiary dance education. *Theatre, Dance and Performance Training*, 6(2), 145-158. https://doi.org/10.1080/19443927.2015.1027452

Roman, C. (2008). *Teoria şi metodica activităţilor motrice pe grupe de vârstă. Note de curs [Theory and methodology of motor activities by age groups. Course notes]*. Editura Universităţii din Oradea, Oradea, Romania.

Roman, C. (2009). *Dezvoltarea aptitudinilor motrice: Handbal [Development of motor skills: Handball]*. Editura Universităţii din Oradea, Oradea, Romania.

Săvescu, I. (2007). *Educaţie fizică şi sportivă şcolară: Culegere de exerciţii: Metodologie [School physical and sports education: Collection of exercises: Methodology]*. Editura Aius, Craiova, Romania

Slováková, M., Bendíková, E., Rozim, R., & Daubnerová, J. (2022). The effect of goal-directed extracurricular physical activities on development of physical abilities in children of early school

age. *Journal of Physical Education and Sport*, 22(5), 1105-1111. https://doi.org/10.7752/jpes.2022.05139

Şerbescu, C. (2008). *Condiția fizică a școlarului mic [The physical condition of the young schoolboy]*. Editura Universităţii din Oradea, Oradea, Romania.