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Original scientific paper

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EFFECTS OF HIGH AND LOW AEROBICS PROGRAMME ON MOTOR ABILITIES OF THE EIGHTH GRADE ELEMENTARY SCHOOL STUDENTS

INTRODUCTION

Many studies have shown that physical activity of the children and the young is on the decline mainly because of the „sedentary” way of life (Mitić, 2001). Beside positive effects, progress, new lifestyles, overpopulation, technological development, pollution of the environment and many other factors also make discordance between motor abilities and an intensive physical growth (Kurelić et al., 1971). Physical Education, as part of general educational system, and of working education, by its activities and content, and through three thematic units: development of physical abilities; acquiring motor knowledge, capabilities and habits; and theoretical education, helps the development of various personal characteristics, such as intellectual, moral, aesthetic and physical ones with the aim to protect health, optimal growth and development of students, thus promoting a healthy lifestyle which cannot be imagined without regular physical activity. Studies up to now have shown that today’s PE lessons in elementary schools are not capable of completely achieving the supposed tasks and aims, suggesting that the organisation of work in the existing circumstances of the educational system is not efficient, nor economic, but old fashioned (Saveljić, 1971; Reljić, 1979; Maksimović, 2000). Enormous efforts are being made with the aim of improving PE lessons by intensifying the teaching process, and that is mainly done by working with „STATIONS”, „homogeneous groups”, „circular training”, as well as by working with “additional exercises” (Arunović et al., 1992). Hence, the question is whether the programmed lessons of aerobics exercising to music, according to the high and low aerobics model, can positively affect optimal growth and development of students, knowing that the working principles of aerobics are identical with methodological principles of PE lessons, and whether it is possible to make aerobics an integral part of regular PE lessons (Popov, 1995; Mandarić, 2003).

That would enable a direct pedagogical work of a PE teacher and his/her insight into the motor abilities of the students, which is of crucial importance in this period of their growth, characterized by an abundance of dynamic and rapid changes of psychosocial development of the students.

Aerobics exercising to music represents a combination of simple running, skipping, power and stretching exercises done in groups, to music, and with an appropriate range and intensity of exercising (Mandarić, 2003; Stojiljković et al., 2005). It has positive effects on motor abilities, coordination, sense of rhythm, and especially on cardio-vascular system (Kuper, 1975; Vozarević, 1992; Sekulić, 1997; Ušanj, 1997; Obradović, 1999; Mandarić, 2003; Sekulić et al., 2003; Cvetković, 2007). High and low aerobics is based on aerobic dance. The intensity of exercising can be high (high-impact), and low (low-impact). Depending on intensity, the type of movement is determined. This way of exercising contributes to both a better professional and pedagogical work and introduces innovations and new working technologies into PE lessons.

The topic of the study is the effect of programmed lessons of high and low aerobics on motor abilities of the eighth grade students of elementary school.

The aim of the study is to define the effects of high and low aerobics on motor abilities of the eighth grade students of elementary school.

METHOD

The experimental programme lasted for eight weeks and it was realized within the regular physical education lessons of the eighth grade students of the „Vožd Karadjordje” elementary school in Leskovac. During that period, the experimental programme was carried out three times a week, in the gymnasium of the mentioned school and lasting one school lesson. The students were divided into two groups. The experimental group (E) attended the lessons of programmed exercises according to the high and low aerobics, while the control group (K) attended the programme according to the curriculum prescribed by the Ministry of Education of the Republic of Serbia.

Sample of the students

The research was conducted on a sample of 60 students (31 girls and 29 boys) of the eighth grade of elementary school, of average age of 14, divided into:

- E – the experimental group N= 30, (E1 - 16 girls and E2 - 14 boys),
- K – the control group N= 30, (K1 - 15 girls and 15 boys).

Sample variables

Motor variables were selected from the Eurofit tests battery, recommended and standardized tests for children of school age. The following tests were applied: so called „Flamingo test” - a test for the evaluation of static equilibrium (MFLAM), Plate tapping - tests speed of limb movement (ATAPR), Sit and reach - flexibility test (MDUBRR), Standing Broad Jump - measures explosive leg power (MSDM), Sit-Ups in 30 seconds - measures trunk strength (MLESED), Handgrip test - measures static arm strength (MDIN), Bent Arm Hang - muscular endurance/functional strength (MZGVIS), 10 x 5 meter Shuttle Run - measures running speed and agility (MTR – 10 x 5m). In addition to Eurofit tests for children, the following tests in the field of general coordination and coordination to rhythm were applied in this study: eight to stoop (Osmica); Steps aside feet (KorSt); stamping and hands clapping (BubNR); jumping to the rhythm (PoRit).

Statistical analysis

All the data obtained by the study were processed by the procedures of descriptive and comparative statistical methods. In the area of the descriptive statistics the following parameters were defined: representative central and dispersive parameters: arithmetic average – M; standard deviation – S; initial and final measures. Unpaired t-test, applied in comparative statistics, was performed in order to compare the mean values of two independent data sets (experimental and control groups). Statistical analysis was performed applying SPSS statistical software.

STUDY RESULTS AND DISCUSSION

According to the results of descriptive statistics (mean values and standard deviation) shown in Table 1, it can be noticed that in the final measuring, the experimental group (E1) achieved better results on all measured variables of motor area except for two (dynamometry and side steps) compared to the students from the control group (K1).

According to the t-test and the importance level (p) shown in Table 1, a statistically significant difference can be noticed between the experimental (E1) and control (K1) groups for the following variables: „Flamingo”, hand tapping, 10x5m shuttle running, stamping and hand clapping and jumping to the rhythm on the level of statistical importance of 95% and 99%.

Table 1. Results of descriptive statistics and t-test of motor abilities of E1 and K1 groups

Variable	Group	N	INITIAL MEASURING				FINAL MEASURING			
			M	SD	t	P	M	SD	t	p
FLAM	E1	16	10.31	4.05	0.96	0.3447	7.38	2.73	-2.56	0.0157 *
	K1	15	8.44	6.70			9.88	2.80		
TAPR	E1	16	13.92	2.00	-2.56	0.0157 *	12.77	1.80	-2.38	0.0239 *
	K1	15	16.00	2.56			14.53	2.53		
DUBPR	E1	16	26.13	5.34	1.83	0.0772	30.63	4.51	3.71	0.0008 **
	K1	15	22.13	5.86			23.25	6.55		
SDM	E1	16	164.50	13.29	1.29	0.2069	170.75	13.10	1.89	0.0685
	K1	15	156.19	22.02			158.69	21.90		
LESED	E1	16	19.31	3.42	1.34	0.1903	21.69	3.20	-0.19	0.8506
	K1	15	17.69	3.44			19.5	3.44		
DIN	E1	16	21.81	4.13	-0.77	0.4473	26.69	4.19	1.86	0.0727
	K1	15	23.13	5.46			27	5.24		
ZGVIS	E1	16	18.65	13.83	1.62	0.1157	21.02	14.64	1.75	0.0903
	K1	15	11.16	12.29			12.58	12.51		
MTR-10x5m	E1	16	21.91	1.16	-2.11	0.0433 *	20.63	1.34	-2.08	0.0462 *
	K1	15	23.13	1.99			21.81	1.83		
OSMICA	E1	16	11.17	1.46	-1.96	0.0593	10.48	1.49	-1.62	0.1157
	K1	15	12.22	1.59			11.36	1.57		
KORST	E1	16	12.53	1.01	-0.64	0.5270	11.93	0.87	-1.71	0.0976
	K1	15	11.23	1.44			10.73	1.45		
BUBNR	E1	16	10.56	1.82	0.35	0.7288	14.38	2.13	3.7	0.0009 **
	K1	15	10.31	2.24			11.13	2.80		
PORIT	E1	16	15.38	4.36	2.87	0.0075 **	19.65	2.18	3.18	0.0034 **
	K1	15	11.44	3.33			15.75	4.45		

Statistically important difference on the level of 95% * 99% **

According to the results of descriptive statistics (mean values and standard deviation) shown in Table 2, it can be noticed that in the final measuring, the experimental group (E2) achieved better results on all the measured variables of motor area, compared to the students from the control group (K2). According to t-test and the importance level shown in Table 2, a statistically important difference can be noticed between the experimental (E2) and control (K2) groups for the following variables: „Flamingo“, hand tapping, sit and reach flexibility, standing broad jump, sit-ups in 30 seconds, hand grip, 10x5m shuttle running, stumping and hand clapping

and jumping to the rhythm, on the level of statistical importance of 95% and 99%. In experimental (E1) group, from the initial to the final measuring, there is a statistically important results improvement for the variable „Flamingo“ compared to the K1 group. The programme of aerobics exercising to music based on the model of high and low aerobics resulted in the improvement of statistical balance of E1 group. Results of the study show that there is a statistically important improvement of the results in the hand moving speed variable (hand tapping) and sit and reach flexibility, from the initial to the final measuring in both experimental groups (E1 and E2) compared to control (K1 and K2) groups.

Table 2. Results of descriptive statistics and t-test of motor abilities of E2 and K2 groups

Variable	Group	N	INITIAL MEASURING				FINAL MEASURING			
			M	SD	t	P	M	SD	t	p
FLAM	E2	14	5.86	4.52	0.32	0.7514	6.07	3.25	-0.76	0.4538
	K2	15	5.27	5.44			7.2	4.59		
TAPR	E2	14	11.42	0.73	-5.06	0.0001 **	10.75	0.75	-4.75	0.0001 **
	K2	15	14.06	1.82			13.21	1.82		
DUBPR	E2	14	22.71	6.24	1.41	0.17	26.86	5.86	2.78	0.0098 **
	K2	15	18.90	8.08			19.8	7.61		
SDM	E2	14	209.00	15.15	2.13	0.0373 *	215.86	15.28	2.91	0.0072 **
	K2	15	196.00	16.67			198.6	16.55		
LESED	E2	14	26.00	1.84	3.51	0.0016 **	28.07	1.98	4.53	0.0001 **
	K2	15	23.47	2.03			24.93	1.75		
DIN	E2	14	39.07	8.40	2.46	0.0206 *	42	8.14	2.31	0.0288 *
	K2	15	32.00	7.08			35.13	7.84		
ZGVIS	E2	14	49.51	35.61	1.11	0.2768	51.81	35.73	1.16	0.2562
	K2	15	37.11	23.46			38.84	23.87		
MTR-10x5m	E2	14	19.76	1.03	-2.1	0.0452 *	18.88	0.84	-2.88	0.0077 **
	K2	15	20.60	1.11			19.96	1.14		
OSMICA	E2	14	10.00	1.87	0.26	0.7968	9.27	1.65	0.07	0.9447
	K2	15	9.84	1.47			9.31	1.48		
KORST	E2	14	11.23	1.44	-0.76	0.4538	10.73	1.45	-1.01	0.3214
	K2	15	11.65	1.56			11.28	1.48		
BUBNR	E2	14	12.71	3.15	0.21	0.8352	15.64	2.95	2.87	0.0079 **
	K2	15	12.40	4.79			12.07	3.69		
PORIT	E2	14	16.93	3.65	2.4	0.0236 *	20.14	1.83	3.47	0.0018 **
	K2	15	12.93	5.15			15.4	4.79		

Statistically important difference on the level of 95% * 99% **

It is obvious that experimental programme of aerobics exercising to music based on the model of high and low aerobics had an equal effect on the improvement of hand moving speed results among the eighth grade students. In experimental (E1 and E2) groups, comparison of initial and final measures shows a statistically important improvement of the results in sit and reach flexibility variable. Stretching exercises, done by both experimental groups at the end of the lesson, had a significant effect on the improvement of results of the back thigh muscles flexibility in E1 and E2 groups compared to K1 and K2. According to the results of the study, a statistically important improvement of the results of absolute power for one variable (dynamometry) in experimental (E1 and E2) groups during initial and final measuring can be noticed. Students from E1 group improved their mean values during final measuring for the above-mentioned variable. Study results show that there is a statistically important improvement for the variable of explosive power of the lower extremities (standing broad jump) among students of E2 group during initial and final measuring. Results from the model of high and low aerobics suggest its effect on the explosive power of lower extremities. Results of the study show that there is a statistically important improvement for the variable of repetitive muscle potential (sit up) among students from E2 group during initial and final measuring. The exercises done with the aim of strengthening trunk muscles after aerobics choreographies had an effect on the improvement of repetitive muscle potential of the eighth grade elementary school students. Results of the study show that there is a statistically important improvement for the variable running speed (10x5m) from initial to final measuring in both experimental (E1 and E2) groups. Results of the study also show that there is a statistically important improvement for the variable coordination in rhythm (stumping and hands clapping and jumping to the rhythm) during initial and final measuring in both experimental (E1 and E2) groups. The effect of the programmed high and low aerobics lessons led to the improvement and the highest possible progress regardless of the achieved statistical importance in variable coordination in rhythm among the eighth grade elementary school students.

CONCLUSION

According to the study results and their interpretation, it can be generally concluded that the observed changes, after carrying out an experimental programme of aerobics exercising of high and low aerobics lasting eight weeks, were significant within the tested area of motor abilities of the eighth grade elementary school students. At the same time, the results of the study confirm that the programmed exercising to music, high and low aerobics, has positive effect on transformation of motor area and students' motivation for exercise, and has practical applicability, compared to the classical and traditional PE lessons, thus suggesting the possibility of introducing aerobics exercising to music into regular PE lessons.

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ABSTRACT

Contemporary physical education is not efficient enough in the existing circumstances of the elementary school educational system. The study aims to determine the effects of high and low aerobics programme on motor abilities of the eighth grade elementary school students. The study was carried out on a sample of 60 eighth grade students (31 girls and 29 boys) of the „Vožd Karadjordje“ elementary school in Leskovac, who were divided into two groups: experimental and control group. The experimental group attended classes of high and low aerobics exercise programme to music, while the control group attended regular classes according to the curriculum prescribed by the Ministry of Education of the Republic of Serbia. The effects of high and low aerobics on motor abilities were observed (12 variables). The results showed that the high and low aerobics programme improved students' motor abilities compared to the students in the control group and proved its practical applicability in Physical Education.

Key words: *Physical Education, motor abilities, high and low aerobics*