

ANTHROPOMETRIC AND MOTORIC DIFFERENCES BETWEEN BOYS AND GIRLS AGED 14-15 YEARS UNDER THE INFLUENCE OF PHYSICAL EDUCATION PROGRAMME

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(Original scientific paper)

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Abstract

57 pupils, aged 14-15 years, 22 girls and 35 boys were involved in this study. The aim of the study was to verify if there are differences between girls and boys in anthropometric and motor parameters, as well as to determine the impact of the physical education program in improving motor skills or not, within a school year, with two hours per week, as it was approved by the Kosovo Ministry of Education. Besides the program of physical education with two hours per week, additional hours are included in the athletics competitions: short and medium length running, competition on three sports games: Football, Basketball and Volleyball; five days swimming, and five day skiing within the regular school year. Both measurements were performed on eight variables: two of them were anthropometric and six of them motor variables: height, weight, sit and rich test, push-ups, standing long jump, sit ups, back extension and running in 60 meters. Initial measurements were made at the beginning of the school year. All variables were compared with the final measurements at the end of the school year to the same variables. Through Canonical discriminant analyses were proved that there were positive changes in favor of the final measurements of motor skills in both sexes as a result of the physical education program. There were also differences between girls and boys in both measurements, except for body weight and flexibility in which variables do not have any important changes.

Key words: program, physical education, influence, positive change.

Introduction

Programming and controlling the transformative process in physical education is of special importance and remains a challenge for teachers, pedagogues and trainers of physical education and sports in general. Physical education programme in elementary and secondary schools consists of two classes per week approved by the Ministry of Education, Science and Technology of the Republic of Kosovo. This study is focused on validating the influence of physical education programme in improvement or not of motoric abilities during a calendar year. In addition, it looked into validation of anthropometric changes and motoric abilities between males and females. Morphological changes during the second decade of life are dramatic, and the period pertains to beginning of adolescence, which lasts from 3 to 5 years on average. Puberty is the period of time when males and females start to develop their physical characteristics of an adult male and female. Females reach their peak growth between 10 and 13, while males between 12 and 15. Both females and males may reveal a strong wave of physical energies during this period of time.

Material & methods

A sample of 57 14-15 year-old students, 22 females and 35 males, all full-time students at "Aga Xhite" private college in Ferizaj, Kosovo, are included in the study. Two measurements were administered along 8 variables – two anthropometric and six motoric ones, including: height (H), weight (W), sit and rich test (SRT), push-ups (PUPS), standing long jump (SLJ), sit ups (SUPS), back extension (BEXT) and 60-meter run (R60m). Initial measurements from the beginning of the school year 2003, were compared to final measurements of the same variables administered in June 2004. Based on results of the parameters, the following statistics are presented: mean (X), standard deviation (SD), Kolmogorov-Smirnov test for normal distribution of the results known as MaxD, while for the differences between

initial and final measurements, as well as for differences between males and females, the Discriminant Canonical Analysis for SPSS package was used. Symbols: (F) Females, (M) Males, (1) first measurements, (2) second measurements.

Results and Discussion

Results from basic statistical parameters with regard to both initial measurements and final measurements for both male and female groups indicate that the data followed normal distribution as per MaxD values and test values in following tables 1 and 2, where all MaxD values of Kolmogorov-Smirnov test are lower than test values: for the female group (Test) = .347 and for the male group (test) = .275. Contrary to normal distribution of results from initial measurements at the beginning of the school year in September 2003, results showed that for final measurements of June 2004 the distribution of results was more compact. The mean for standing long jump for girls (Mean) = 147.27cm and for boys (Mean) = 189.60cm of the initial measurements of this research was compared to the mean of standing long jump of girls with (Mean) = 138.28cm and of boys (Mean) = 181.54 of the research conducted by Gontarev S, Zivkovic V, Naumovski M, Kalac R, (2013), considering the sample size included in research.

Table 1. Basic statistical parameters

Female						
Initial measurement				Finale measurement		
Variable	Mean	SD	MaxD	Mean	SD	MaxD
H	1609.64	59.70	0.15	1620.45	58.61	0.11
W	56.91	10.56	0.13	59.27	10.86	0.16
SRT	42.77	8.29	0.13	45.32	7.80	0.14
PUPS	3.73	4.00	0.08	7.82	5.31	0.15
SLJ	147.27	23.76	0.10	152.32	22.76	0.23
SUPS	17.59	10.81	0.15	37.18	14.43	0.14
BEXT	19.32	13.60	0.17	38.18	13.95	0.15
R60m	11.86	1.88	0.16	10.85	1.07	0.18

Test .347

Symbols: Height (H), weight (W), sit and rich test (SRT), push-ups (PUPS), standing long jump (SLJ), sit ups (SUPS), back extension (BEXT) and running in 60 meters (R60m).

Table 2. Basic statistical parameters

Male						
Initial measurement				Finale measurement		
Variable	Mean	SD	MaxD	Mean	SD	MaxD
H	1704.26	85.72	0.15	1735.86	76.52	0.07
W	60.03	11.72	0.13	65.06	11.14	0.10
SRT	42.57	8.23	0.13	44.29	8.89	0.09
PUPS	13.66	7.22	0.08	20.40	7.80	0.16
SLJ	189.60	20.55	0.10	206.89	19.12	0.08
SUPS	33.34	16.97	0.15	59.29	36.83	0.24
BEXT	46.46	20.44	0.17	55.69	19.15	0.24
R60m	9.22	0.78	0.16	8.63	0.60	0.08

Test .275

For changes between initial and final measurements among girl sample see Table 3. For changes in boys' sample, see Table 4. We have utilized discriminant canonical analysis and T-test for dependant groups. From obtained results, we can state that there were positive changes in favour of final measurements under the influence of physical education programme during a school year. The justification for this is the following: students had not had prior basic information with regard to movement techniques in certain sports; they lacked information on running techniques, timely reaction,

acceleration, positioning of feet during running and at finish. In addition, criteria set by the physical education teacher in tests for assessing motor abilities, criteria they had to meet to get a positive grade, mobilized students to improve their motor skills. Competitions organized in sports mentioned above have also affected the increased positive competition between different classrooms, thus affecting positively students' motor abilities as well. None of the 57 tested students in the sample could not swim or ski, while after the five day training of swimming and skiing, students obtained at least two swimming techniques: free style and frog style, and at least three skiing techniques: diagonal skiing, snowplow and parallel turn. Curriculum of physical education course was implemented fully at 100% and it was closely monitored by the respective school management.

Table 3 T-Test for dependent group Female and Male

t-Test for dependent group Female						t-Test for dependent group Male					
Variable	Mean	SD	Diff.	T	sig	Variable	Mean	SD	Diff.	T	Sig
H1	1609.64	59.70	-10.82	-7.54	0.00	H1	1704.26	85.72	-31.60	-8.80	0.00
H2	1620.45	58.61				H2	1735.86	76.52			
W1	56.91	10.56	-2.36	-4.54	0.00	W1	60.03	11.72	-5.03	-7.44	0.00
W2	59.27	10.86				W2	65.06	11.14			
SRT1	42.77	8.29	-2.55	-2.10	0.00	SRT1	42.57	8.23	-1.71	-1.81	0.08
SRT2	45.32	7.80				SRT2	44.29	8.89			
PUPS1	3.73	4.00	-4.09	-3.83	0.04	PUPS1	13.66	7.22	-6.74	-	0.00
PUPS2	7.82	5.31				PUPS2	20.40	7.80			
SLJ1	147.27	23.76	-5.05	-1.78	0.00	SLJ1	189.60	20.55	-17.29	-7.40	0.00
SLJ2	152.32	22.76				SLJ2	206.89	19.12			
SUPS1	17.59	10.81	-19.59	-9.30	0.00	SUPS1	33.34	16.97	-25.94	-5.69	0.00
SUPS2	37.18	14.43				SUPS2	59.29	36.83			
BEXT1	19.32	13.60	-18.86	-6.82	0.01	BEXT1	46.46	20.44	-9.23	-3.92	0.00
BEXT2	38.18	13.95				BEXT2	55.69	19.15			
R60m1	11.86	1.88	1.00	3.74	0.00	R60m1	9.22	0.78	0.58	6.50	0.00
R60m2	10.85	1.07				R60m2	8.63	0.60			

Symbols: (1) First measurements, (2) second measurements, height (H), weight (W), sit and rich test (SRT), push-ups (PUPS), standing long jump (SLJ), sit ups (SUPS), back extension (BEXT)and running in 60 meters (R60m).

Table 4 .T-Test for independent group Female and Male

INITIAL MESUREMENT						FINAL MESUREMENT					
Variable	Mean	SD	Diff.	T-value	Sig.	variable	Mean	SD	Diff.	T-value	Sig.
FH	1609.64	59.7	94.62	-4.906	0.00	FH	1620.45	58.61	-115.4	-6.417	0.00
MH	1704.26	85.72				MH	1735.86	76.52			
FW	56.91	10.56	-3.12	-1.04	0.30	FW	59.27	10.86	-5.78	-1.938	0.05
MW	60.03	11.72				MW	65.06	11.14			
FSRT	42.77	8.29	-0.2	0.09	0.92	FSRT	45.32	7.8	1.03	0.46	0.64
MSRT	42.57	8.23				MSRT	44.29	8.89			
FPUPS	3.73	4	-9.93	-6.666	0.00	FPUPS	7.82	5.31	-12.58	-7.244	0.00
MPUPS	13.66	7.22				MPUPS	20.4	7.8			
FSLJ	147.27	23.76	-42.33	-6.892	0.00	FSLJ	152.32	22.76	-54.57	-9.361	0.00
MSLJ	189.6	20.55				MSLJ	206.89	19.12			
FSUPS	17.59	10.81	-15.75	-4.282	0.00	FSUPS	37.18	14.43	-22.1	-3.183	0.00
MSUPS	33.34	16.97				MSUPS	59.29	36.83			
FBEXT	19.32	13.6	-27.14	-6.018	0.00	FBEXT	38.18	13.95	-17.5	-3.982	0.00
MBEXT	46.46	20.44				MBEXT	55.69	19.15			
FR60m	11.86	1.88	2.645	6.273	0.00	FR60m	10.85	1.07	2.22	8.856	0.00
MR60m	9.22	0.78				MR60m	8.63	0.6			

Symbols: Female (F), male (M), Height (H), weight (W), sit and rich test (SRT), push-ups (PUPS), standing long jump (SLJ), sit ups (SUPS), back extension (BEXT)and running in 60 meters (R60m).

To see differences in anthropometric and motor abilities between female and males we used the discriminant canonical analysis, i.e. T-test for independent groups. Differences between females and males were evident in initial and final measurements in all applied tests, with exclusion of the variables on Weight and Flexibility, in which there were no differences either in initial or final measurements. A plausible explanation for this could be the fact that 14-15 age group for boys is still an early phase to add weight which would differentiate them from girls, but as a result of this, flexibility abilities of boys in the sample were not statistically significant different from girls.

Conclusions

The study was focused in validating the influence of physical education programme in improvement or not of motor abilities during a school year. The study also focused on validating differences in anthropometric and motor abilities between females and males for a 14-15 year-old sample, which is an age that pertains to puberty period and it is featured with dramatic anthropometric and motor changes. The results of the study indicated that there were positive changes in both genders in favour of final measurements as a result of the physical education programme during the regular school year. In addition, other curricular activities were organized, including training on swimming, skiing, sport competitions, which are envisioned by the school curriculum and implemented based on opportunities provided by the school. Also, gender differences between females and males for the 14-15 age groups were evident in both measurements, excluding two variables on weight and flexibility, where there were no statistically significant differences. The role of physical education pedagogue in implementing the curriculum, commitment to student achievement of skills, economic and infrastructure conditions at the school, are all important factors in children's wellbeing with regard to improvement of their psychosomatic status, and extending active time doing sport and recreation activities also serve well to students' health, and in this aspect, the Ministry of Education, Science and Technology could give its contribution by increasing the number of classes for physical education from two to three hours per week.

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