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The Effect of Play Education on Some Physical Features and Growth in Children

Nebahat ELER¹, Serdar ELER²

¹Bulent Ecevit University, School of Physical Education and Sports, Zonguldak, TURKEY

²Gazi University, Faculty of Sports Sciences, Ankara, TURKEY

Email: nebahateler@gmail.com, seler@gazi.edu.tr

Abstract

Aim: The aim of the present study was to investigate the effects of play education on some physical features and growth of girls between 8-12 years of age. **Method:** 186 girls between 8-12 years of age were included in the study as the Play Group (PG), and 125 girls were included as the Control Group (CG), which makes a total of 311 girl participants. The PG received educational play activities program that aimed to develop skill, coordination, speed and strength features for 6 months, 3 days a week, for 45 minutes. Before and after the program, the Body Height (H), Body Weight (W) and Body Fat Rate (BFR) values of the students were measured. The data obtained in these measurements were saved in the SPSS Program. In order to determine the differences between the groups and the differences between the groups in terms of age, the t-test in Independent Groups was applied; and to determine whether the difference between the groups was significant or not, the One-Way Variance Analysis was applied. The significance level was accepted as $p < 0.05$. **Results:** According to the t-test results, there was a significant difference between the first and second BFR measurements ($p < 0,05$). The BFR values decreased in the PG but increased in the CG. A significant difference was determined between the H and W values between different age groups ($p < 0,05$). **Conclusion:** Increases that were consistent with the age periods of children were observed in the children who participated in our study, and these increases were at a more significant level in the PG when compared with the CG. However, while there was a decrease in BFR in the PG, an increase was determined in the CG. As a result, it is possible to claim that 6-month play education has positive effects on the increase of the H and W, and in the decrease of the BFR in girls between 8-12 years of age.

Keywords: Growth, Physical Features, Child, Body Fat Rate

Introduction

In childhood, there are certain periods when anatomical and physiological changes and developments are at maximum levels, and sometimes there are several problems in these changes. Especially in this period, which is also called as growth spurt, significant and fast increases are observed in height and weight levels of the body (Soliman et al. 2014). This period also denotes the stage when children combine movement structures and start to use them in sportive skills. It has been reported that the most sensitive period in skill teaching is between the years 9-12 in children (Borms, 1986). The Basic Movement Period is claimed to be between 7-9 years of age (Larson et al., 1995). For this reason, it is important that children reach the necessary physical competence in terms of sportive performance and health in this period. For this reason, plays and play educations are necessary in the basic movement period. During plays, children repeat certain actions and this increases the muscle development in a natural way (Kaya, 2007). During playing plays, the whole body of the child is in action. Plays that include running, jumping, climbing, crawling, etc. movements that require physical power ensure that the body systems of children work regularly, and this contributes greatly to the physical development of them. The repetition of movements and their succession increase the performance of children (Poyraz, 2003). The skill to reach certain performance standards is called as physical fitness. In determining this performance, it is necessary that the individuals are subjected to certain tests (Freedson et al., 2000). For this reason, it is important that the physical fitness, which affects the efficacy in daily life and sportive activities, is determined in early ages (Gökmen et al., 1995). As reported in the current literature, it is important to determine the physical fitness levels in this age group when growth parameters of children are at the peak level. Determining the physical fitness levels and differences of children who are between these age groups is important for being able to observe the growth periods of them, and it is foreseen that the differences between ages in mixed groups -even the difference in terms of months in the same age group- may have negative effects on showing the real performances of children. The aim of the present study is to investigate the effects of play education on some physical fitness features of girls between 8-12 years of age.

Materials and Methods

186 girls between 8-12 years of age were included in the study as the PG, and 125 girls were included as the CG, which makes 311 participants in total. The PG received educational play activities program that aimed to develop skill, coordination, speed, endurance and strength features for 6 months, 3 days a week, and for 45 minutes. Before and after the program, the H, W and BFR values of both groups were measured. The W of the students was measured with an electronic scale that had a sensitivity of 0.1 kg; the H was measured with a Digital Height Measurement Device with 0.01 cm sensitivity; and the BFR was measured at the triceps and calf areas. The measurements were made with Skinfold Caliper.

The data obtained in the measurements were saved in the SPSS Program. In order to determine the age differences between the groups, the *t*-test was applied in the independent groups; and the One-Way Variance Analysis was applied in order to determine whether the differences between the groups were significant or not. The significance level was accepted as $p < 0.05$.

Table 1. Physical Features of the PG and CG

age(year)			Control Group				Play Group			
			Avr.	Std. Dev..	Min.	Max.	Ort.	Std. Sap.	Min.	Max.
8	1. test	height (cm)	126,5	7,14	112	138	129	6,12	118	143
		weight (kg)	25,12	4,92	17	36	25,81	6,03	15	41
		fat rate (%)	24,97	4,27	16,7	33,4	26,46	6,13	16,2	43,2
	2. test	height (cm)	128,9	6,9	115	140	131,8	6,02	122	146
		weight (kg)	27,22	5	19	36	29,22	5,63	21	43
		fat rate (%)	35,78	51,79	16,9	289	24,17	5,16	15,4	38,4
9	1. test	height (cm)	135	9,86	118	151	134	8,72	119	150
		weight (kg)	33,08	9,85	19	54	31,47	9,21	17	55
		fat rate (%)	25,22	5,64	16,4	34,7	28,26	5,56	17,6	36,7
	2. test	height (cm)	137,2	9,63	120	152	137,2	8,45	122	152
		weight (kg)	35,6	9,81	21	56	34,03	8,38	19	56
		fat rate (%)	25,58	5,1	16,1	34,3	25,06	4,46	16,1	31,2
10	1. test	height (cm)	139	7,99	122	151	140,6	8,47	121	156
		weight (kg)	39,58	9,23	26	56	38,86	9,31	23	56
		fat rate (%)	30,1	4,58	21,9	37,3	30,44	5,35	15,3	39,1
	2. test	height (cm)	141,3	7,86	125	153	144,5	8,39	125	160
		weight (kg)	41,67	9,04	28	57	40,73	8,43	26	56
		fat rate (%)	30,36	5,27	15,8	38,7	27,8	4,4	15,6	35,2
11	1. test	height (cm)	142,5	5,75	132	156	143	7,54	129	160
		weight (kg)	36,76	7,99	26	51	37,8	10,27	25	70
		fat rate (%)	25,44	7,1	12,3	36,9	28,4	5,48	21,7	41,9
	2. test	height (cm)	144,3	5,76	133	158	146,8	7,52	132	162
		weight (kg)	39,32	8,02	29	56	39,73	9,8	29	70
		fat rate (%)	26,67	6,65	13,8	35,8	24,25	5,92	15,9	38,4
12	1. test	height (cm)	150,6	8,77	134	169	147,9	8,06	130	165
		weight (kg)	44,72	7,74	30	60	41,41	8,4	22	59
		fat rate (%)	24,36	4,92	14,7	33,4	24,74	4,2	17,6	33,6
	2. test	height (cm)	152,7	8,89	137	171	151,2	7,6	136	167
		weight (kg)	47,36	7,79	33	64	43,09	7,96	25	60
		fat rate (%)	25,89	4,27	16,5	33,7	22,53	3,8	15,6	29,6

The PG: 8-9-10-11-12 age. respectively ; n: 36-36-36-37-37.

The CG: 8-9-10-11-12 age.respectively; n: 25-25-25-25-25.

Results

According to the *t*-test results in dependent groups, the H, W and BFR averages in the CG deferred between the first and second measurements at a statistically significant level ($p < 0,05$). The second measurement averages of the H, W and BFR, which showed differences, were higher than the first measurement results at a significant level. In the PG, the H, WandBFR averages showed significant differences between the first and second measurements ($p < 0,05$). While the second measurements in height and weight were significantly higher than the first measurements, the BFR measurement results showed a significant decrease in the second measurement.

Table 2. Comparison between 1st and 2nd measurements of the CG and PG

group			N	Ort.	Std. Sapma	t	p
control group	Height (cm)	1. ölçüm	125	138,65	11,3	-27,628	0,000*
		2. ölçüm	125	140,78	11,15		
	Weight (kg)	1. ölçüm	125	35,74	10,39	-24,557	0,000*
		2. ölçüm	125	38,12	10,45		
	Fat rate (%)	1. ölçüm	125	25,98	5,69	-1,424	0,000*
		2. ölçüm	125	28,9	24,05		
play group	Height (cm)	1. ölçüm	186	139,36	10,07	-43,437	0,000*
		2. ölçüm	186	142,82	10,1		
	Weight (kg)	1. ölçüm	186	35,45	10,36	-16,998	0,000*
		2. ölçüm	186	37,69	9,54		
	Fat rate (%)	1. ölçüm	186	27,78	5,65	21,199	0,000*
		2. ölçüm	186	24,78	5,13		

P<0.05*

Table 3. Differences according to age groups

Age (years)		Group	N	Average	Std. Deviation	t	p
8 control n: 25	height difference (cm)	control	26	2,31	0,79	-2,096	0,041*
		play	32	2,78	0,91		
	body weight difference (kg)	control	26	2,1	0,82	-4,279	0,000*
		play	32	3,41	1,36		
play n: 37	body fat (%) difference	control	26	10,82	50,25	1,478	0,145
		play	32	-2,29	1,52		
9 control n: 25	height difference (cm)	control	25	1,8	0,9	-4,064	0,000*
		play	34	3,24	1,07		
	body weight difference (kg)	control	25	2,52	1,33	-0,101	0,92
		play	34	2,56	1,54		
play n: 37	body fat (%) difference	control	25	0,36	1,41	7,452	0,000*
		play	34	-3,21	2,07		
10 control n: 25	height difference (cm)	control	24	2,29	0,91	-6,634	0,000*
		play	37	3,92	0,95		
	body weight difference (kg)	control	24	2,08	1,14	0,561	0,577
		play	37	1,86	1,67		
play n: 37	body fat (%) difference	control	24	0,26	1,73	7,485	0,000*
		play	37	-2,64	1,29		
11 control n: 25	height difference (cm)	control	25	2,16	0,87	-9,178	0,000*
		play	49	3,84	0,92		
	body weight difference (kg)	control	25	2,56	0,96	1,47	0,146
		play	49	1,94	1,99		
play n: 38	body fat (%) difference	control	25	1,23	1,12	12,352	0,000*
		play	49	-4,15	2,02		
12 control n: 25	height difference (cm)	control	25	2,08	0,81	-4,229	0,000*
		play	34	4,86	1,21		
	body weight difference (kg)	control	25	2,64	1,08	2,406	0,019*
		play	34	1,68	1,77		
play n: 38	body fat (%) difference	control	25	1,53	1,44	8,383	0,000*
		play	34	-2,21	1,86		

P<0.05*

The first and second measurement differences in the 8th year of age showed significant differences in the PG and CGs ($p < 0.05$). The changes in the H and W were higher in the PG at a significant level. The BFR did not show any differences in the and CGs. In the 9-year-old Age Group; the H and BFR values showed significant differences between the first and second measurements in the PG and CG ($p < 0.05$). The H increased more in the PG when compared to the CG. The BFR, on the other hand, decreased in the PG, and increased in the CG. In the 10-year-old Age Group, the H and BFR values showed significant differences between the first and second measurements in the PG and CG ($p < 0.05$). The H values increased in the PG when compared with the CG. The BFR decreased in the PG and increased in the CG. In the 11-year-old Age Group, the H and BFR differed at a significant level between the first and second measurements in the PG and CG ($p < 0.05$). The H values increased more in the PG when compared with the CG. The BFR values decreased in the PG and increased in the CG. In 12-year-old Age Group, the differences between the first and second measurements were significant in the PG and CG at a significant level ($p < 0.05$). The increase in the H was more in the PG and the W was more in the CG. In the PG, the BFR values decreased, while these values increased in the CG.

Discussion and Conclusion

Growth may be defined as the increases observed in the height and weight levels of the body, and the changes in the volumes of the organs (Bilgin, 2007: Narrated by Gül, 2013). In many studies, growth has been defined as the increase in the organism in terms of height, weight, and volume (Yıldırım, 2008). In girls, the growth rates increase between 10-11 years of age (Çoban B., Ünver A., 2007). This period is the starting point of the puberty in girls (Çelebi, 2000). With the puberty period, which is the most dynamic period of human life, many physical, physiological and psychological changes occur in the body (Biro et al., 2001). In this period, important changes occur in the body composition with the height and neuro endocrine system. In this study, H and W values showed differences at significant level in both groups between the first and second measurements ($p < 0,05$). This difference is higher than the first measurement average in H and W. Children are in a growth and development process that may be observed clearly. In healthy children, no retardations occur in any process that occurs in the usual manner; on the contrary, there might be increases (Demirci Ali, Demirci Erdal, Demirci Nevzat, 2013).

Again in both groups, the BFR values showed significant differences between the first and second measurements ($p < 0,05$). However, the BFR values decreased in the second measurement at a significant level in the PG, while the BFR values increased in the Control Group. Kanbur et al. (38) reported that there was increase in the fat tissue with the puberty; however, there were differences in regional fat tissues between the two genders. In this study, the BFR increased in the CG, and decreased in the PG. In the light of this result, it is assumed that play education has a positive effect on the fat rate in the body. Berkey et al. (2008) concluded in his study that there was a relation between the excessive weight rates in pubertal period instead of decrease and the limited sportive activities in our society. Hazar and Taşmektepgil (2008) conducted a study and investigated the effects of balance and flexibility on agility in pre-puberty period in children from 11.12 ± 0.96 mean age group. Yıkılmaz et al. (2015) conducted a study with primary and secondary school children whose height average value was 139.95 ± 7.59 cm; average weight value was 35.34 ± 7.81 kg; average age value was 10.67 ± 0.47 , and who were between 8-12 ages, to assess the physical fitness levels in

performance parameters, and reported the average height in girls as 156.20 ± 7.22 cm; average W as 51 ± 11.86 kg, and average body fat rate (%) as 12,05. Larson and Zaichkowsky (1995) conducted a study on children and teenagers and reported that the average H was $126,32 \pm 5,12$ cm; average BE was $26,52 \pm 5,42$ kg; BFR (%) was $9,13 \pm 1,90$ in 8-year-old girls; and the average H was $130,00 \pm 5,34$ cm; average W was $28,04 \pm 5,42$ kg; $31,87 \pm 6,01$;average BFR(%) was $12,76 \pm 7,31$ in 9-year-old girls. Hazar et al. (2009) conducted a study on puppetry period children whose average age was 11.12 ± 0.96 years, and reported that the average H was 140.26 ± 6.77 cm; average W was 34.74 ± 5.33 kg. R. M. Malina (1994) conducted a study on girl volleyball players whose average age was 10 ± 1.2 , and reported the average H, WandBFR as 141 ± 6.6 cm; 31.3 ± 3.5 kg; and $24,52 \pm 9,7$ (%). Prokopec et al. (2003) conducted a study on girl volleyball players whose average age was 10 ± 1.2 years, and reported that the BFR, W and BFR as 144.6 ± 5.2 cm; 33.7 ± 4.2 kg and $25 \pm 7,8$ (%). Baker and Davison (2011) reported the BFR as 26.74 ± 7.20 . There are studies in the literature showing different rates in body fat rates. In the puberty period, the body weight and BFR increase at a significant level in girls (Koz, 2008).

In the present study, when the PG and the CG are considered in terms of age, the PG and CG showed significant differences between the first and second H measurements. The H and W values increased more in the PG when compared with the CG. The age group 10-11 (especially 12-year-old age group) had higher values, which is parallel to the puberty period values reported in the literature. The significant increase in H and W may be explained with the positive effects of growth and educational play program. Watts et al. (2003) reported that there were significant differences between children from similar age groups who received and did not receive regular sports education in terms of height and weight. There are significant differences in the 8 and 12 age groups in terms of W in the PG and CG in our study. While decreases were detected in the PG, increases were detected in the Control Group. The BFR showed significant differences in 9-10-11-12 years of age between the first and second measurements in the PG and CG at a significant level. While the BFR decreased in the PG, it increased in the Control Group at a significant level. Backous et al. (1990) reported significant differences between the body weight and body fat rates of early adolescents who did and who did not do regular exercises. Saygın et al. (2005) conducted a study to determine the effects of movement education in children on physical fitness features and found significant differences between the PG and CG in terms of pretest and posttest body weight values at a value of $p < 0,01$ in the PG, while they did not find and significant differences in the CG. Mahoney, C. (1992) reported that children who dealt with sports gained more height when compared with those who did not deal with sports. Ibiş et al. (2003) conducted a study on children between 12-14 ages, and detected significant developments in the body heights and weights of children who attended to the football school and those who did not attend.

In Europe, (Aksglaede et al., 2008) and in our country, the puberty starts between 10-12 in girls. Since growth hormone is secreted more in the early years of puberty period, the growth in height is more. Çelebi F. (2000) reported that the increase in height in girls in this period was around 6-8 cm. Astandrat and Rodalh reported that there was a fast growth in the early years of life in children, and around 7 cm growth rate was observed in girls in puberty. In the present study, the results are parallel to those reported in the literature when the 6-month program is considered. Educational plays, which are considered within the context of physical education and sports, ensure the healthy growth and development of children in bodily, psychological and sociological terms (Aytaç, 2003). In addition, educational plays also provide good opportunities for the development of motor skills. In childhood period, children

who attend play activities are affected positively in this process in terms of growth and development; and it becomes easier to gain movement skills in primary school period (Gray, 2003). In further years, they become healthier and more conscious (Jimmy, 2003). The heights and weights of children increase during normal development periods; however, it is observed that these increases are more in children who are physically active. In the present study, it is possible to claim that play education has an important role in the growth and development of children, which is also the case in physical activity and sports.

Conflicts of Interest

The authors have no conflicts of interest to acknowledge.

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