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Investigation of The Effects of Physical Education and Sports Activities on The Motor Skills of Preschool Children in Terms of Gender Differences

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Ethical Statement: It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.

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Abstract

In the study, the effects of physical education and sports activities on the motor skills of preschool children were examined in terms of gender differences. Physical education and sports activities in the form of educational games were applied to 30 pre-school students aged 5-6, boys (n=15) and girls (n=15), 2 days a week and 30 minutes for 12 weeks. Physical education and sports activities; While it included walking, running, jumping and balance exercises, materials such as balls, ropes, funnels and hoops were used. The study was organized according to the pretest and posttest method. Children's motor skills were evaluated by applying motor performance tests developed by Morris, Atwater Williams and Wilmore (1980) that included balance, agility, running, catching, standing long jump and throwing criteria. The data obtained with the pretest and posttest method were analyzed by using the SPSS 23.0 statistical program and applying the t test (Paired-Sample t test) for dependent samples between the tests. According to the findings, the performances of both boys and girls in motor skill tests were found to be statistically significant ($p<0.01$). It can be said that physical education and movement training have a positive effect on motor performance in children aged 5-6. When the data were examined in terms of gender differences, it was concluded that female students made 3.03% more improvement in the balance test and 2.62% more improvement in the agility test than male students. With the development in other parameters, it was in favor of male students. Accordingly, male students were 2.78% more successful in the running test, 13.77% in the catching test, 5.33% in the standing long jump test and 6.48% in the throwing test. In conclusion; It can be said that physical education and sports activities can positively contribute to the development of motor skills of 5-6 years old preschool boys and girls. However, it should be examined whether the positive development observed in children's motor performance occurs as a result of the natural course of growth processes or as the positive contribution of physical education and sports movements.

Keywords: Physical education and sports, gender differences, motor skills, motor performance, pre-school education.

Beden Eğitimi ve Spor Etkinliklerinin Okul Öncesi Dönemdeki Çocukların Motor Becerilerine Etkisinin Cinsiyet Farklılıkları Açısından İncelenmesi

Özet

Çalışmada, beden eğitimi ve spor etkinliklerinin okul öncesi çocukların motor becerilerine etkisi cinsiyet farklılıkları açısından incelenmiştir. 5-6 yaş gurubu erkek(n=15) ve kız(n=15) 30 okul öncesi eğitim gören öğrenciye, 12 hafta boyunca haftada 2 gün v e 30 dakika süren, eğitsel oyun formunda beden eğitimi ve spor aktiviteleri uygulanmıştır. Beden eğitimi ve spor aktiviteleri; yürüyüş, koşu, atlama ve denge egzersizleri içerirken, top, ip, hunu ve çember gibi materyaller kullanılmıştır. Çalışma ön test ve son test metoduna göre düzenlenmiştir. Çocukların motor becerileri Morris, Atwater Williams ve Wilmore (1980) tarafından geliştirilmiş, denge, çabukluk, koşu, yakalama, durarak uzun atlama ve fırlatma kriterleri içeren motor performans testleri uygulanarak değerlendirilmiştir. Öntest ve sontest yöntemi ile elde edilen veriler SPSS 23.0 istatistik programı kullanılarak, testler arasındaki bağımlı örneklemler için t testi (Paired-Sample t test) uygulanarak analiz edilmiştir. Elde edilen bulgulara göre, hem erkek hem de kız çocukların motor beceri testlerindeki performansları istatistiksel olarak anlamlı bulunmuştur ($p<0,01$). Beden eğitimi ve hareket eğitiminin 5-6 yaş grubu çocuklarda motor performansa olumlu etki ettiği söylenebilir. Veriler cinsiyet farklılıkları açısından incelendiğinde, kız öğrencilerin erkek öğrencilere göre denge testinde %3,03, çabukluk testinde ise %2,62 daha fazla gelişim sağladığı sonucuna ulaşılmıştır. Diğer parametrelerdeki gelişimle ise erkek öğrenciler lehine oluşmuştur. Buna göre erkek öğrenciler koşu testinde %2,78, yakalama testinde %13,77, durarak uzun atlama testinde %5,33 ve fırlatma testinde %6,48 daha başarılı olmuşlardır. Sonuç olarak; beden eğitimi ve spor aktivitelerinin 5-6 yaş grubu okul öncesi erkek ve kız çocukların motor becerilerinin gelişimine olumlu katkı sağlayabileceği söylenebilir. Fakat, çocukların motor performanslarında gözlenen olumlu gelişmenin, büyüme süreçlerinin doğal seyri içerisindeki bir durum olarak mı yoksa beden eğitimi ve spor hareketlerinin olumlu katkısı olarak mı ortaya çıktığı incelenmelidir.

Anahtar Kelimeler: Beden eğitimi ve spor, cinsiyet farklılıkları, motor beceri, motor performans, okul öncesi eğitim.

INTRODUCTION

In childhood, when activity is quite intense, it is very important to meet the movement requirements and needs of children in this period in order for their development periods to proceed healthily. Studies involving basic movement skills are extremely important in the development of biomotor skills such as endurance, strength, flexibility and coordination of children in this period. Physical education, movement skills and sports activities performed during this period have positive effects on physiological parameters such as the circulatory system, skeletal and muscular system, and respiratory system. Physical activity is one of the basic needs in the development process for children in this period. So, it is thought that regular and periodic physical activities for children in this period to improve their movement skills will positively affect their development processes (8, 23). Motor development is the changes in motor behavior over a period of time that includes the entire lifespan. Motor development is also evaluated in terms of both duration and result. Process evaluation; While defining the factors that affect changes in motor skills throughout life; Changes in motor behaviors and skill performances over a period of time are defined as results (14). It is known that the experiences gained in the first years of childhood affect the child's values, attitudes and behaviors in his future life (4, 13, 15). Preschool period is the period when the child's development accelerates. It includes many critical periods that children go through until they start basic education, and it is important because the development rate of children is very high during this period (7).

By implementing pre-school education programs that include physical education and sports activities in children in this period, it is aimed to support the physiological development of small and large muscles of children, and it is evaluated that it will contribute to the development of features such as correct and healthy posture development and skills. In many studies; reported that physical education and sports-based training programs provide improvement not only in movement skills but also in small and large muscle groups, and supported these predictions (16, 20, 26). The purpose of this study is to examine the effects of regular physical education and sports activities on the motor development of 5-6 year old preschool children. However, the main purpose of the study is to examine this effect in terms of gender differences based on pretest and posttest data within the experimental group.

METHOD

In the study, the effects of physical education and sports activities on the motor skills of preschool children were examined in terms of gender differences. A total of 30 preschool students [females (n=15), males (n=15)] aged 5-6 who were enrolled in a preschool program and had at least a 1-year preschool education background participated in the study. In the research, a pretest-posttest experimental design without a control group was used. The research was conducted using a two-group pretest-posttest experimental design, one of the quantitative research approaches.

In the study, a physical education and sports activity including movement training was applied to a total of 30 pre-school students in the 5-6 age group, consisting of boys and girls, for 30 minutes, 2 days a week, for 12 weeks. In order for the training process to run more smoothly, the participants were divided into age groups (15 students in the 5-year-old group and 15 students in the 6-year-old group) and were subjected to the same movement training on separate days and hours. Within the scope of movement training, exercises including warm-up movements were applied to the children in the form of educational games for the first 10 minutes from the beginning of the study, followed by walking exercises, jogging exercises, jumping exercises and balance exercises, exercises using balls and ropes, rings, hoops, funnels and so on. Exercises using similar materials were applied. In the final parts of the study, static stretching exercises were applied.

Motor Skills Tests

Motor skill tests were developed by Morris et al. (1980) to determine the motor performance of preschool children (15). The validity and reliability study of the test was tested in the study titled "Examination of the Motor Performance of Preschool Children" conducted by Sevimay (1986) with the participation of 205 children in the 3-6 age group (20). Skills tests; It includes 6 evaluation criteria: balance, quickness, running, catching, standing long jump and throwing tests (8). Motor skill tests were administered to two experimental groups of preschool students, consisting of 15 boys and 15 girls, in accordance with the protocol.

Balance test; It measures how long it takes the child to complete the starting and finishing point on a 2-meter rope by walking and maintaining balance. The child is asked to walk as fast as possible on a rope on flat ground. The best time is recorded after three attempts.

Agility Test; This test measures agility performance. The child is asked to lie on his/her back on a flat and non-slip surface. Then, when the command is given, he/she is asked to stand up, run forward the specified distance of 3.05 meters, pick up the tennis ball on the ground at the end of the test area, turn around and run back to his/her previous position. Once the child has collected the tennis ball and crossed the center line, the clock is stopped. Then the best time is recorded after three attempts.

Running Test; It determines how long it takes the child to run forward a distance of 12 meters within the test area. The child is asked to run as fast as possible between the start and finish points of the test area on a flat and non-slip surface. Then the best time is recorded after three attempts.

Catching Test; It determines the child's ability to catch a ball thrown high from the air while standing steadily. First, a tennis ball is thrown from the air to a child standing at a fixed point. Then, the child is asked to catch the ball. Then, it is determined how far back he/she moves from the fixed point while trying to catch the ball. After three attempts, the best distance is recorded.

Standing long jump Test; It determines how far the child can jump forward with both feet, bending his knees, while standing on a stable surface with the soles of his feet on the ground. After three trial, the average distance is taken into statistical evaluation.

Throwing Test; It determines the child's throwing skills. The child is asked to take the tennis ball and throw it as far as possible when he/she feels ready. Then the point where the ball lands is marked. The distance between the throwing point and the point where the ball lands is measured and recorded. The same procedure is repeated 3 times. The best distance is recorded.

Data Analysis

The data obtained was analyzed using the SPSS 23.0 package program. In descriptive statistical methods, parameters such as mean values and standard deviation are determined. It was determined that

pretest/posttest measurements showed normal distribution (P> 0.05) using Kolmogorov-Smirnov and Shapiro-Wilk tests.. Then, Paired-Samples T Test was applied for intra-group comparisons and related measurements. With this test, it is determined whether the difference between the averages of the tests is significant after two tests are applied to a single group (24). Statistical significance was evaluated at p<0.05 and p<0.01 levels.

Ethical approval and institutional permission

It was unanimously decided that the research protocol complies with the Ethics Committee Directive with the decision of Selcuk University Faculty of Sports Sciences Ethics Committee dated 30.01.2024 and numbered 2024/21.

FINDINGS

The data obtained after the motor performance tests applied to 30 male and female pre-school students aged 5-6 studying in a pre-school education institution are in table 1. and is presented in table 2.

Table 1. Comparison of motor performance tests of preschool males according to pre-test and post-test results

		Male (n=15)			
Variables	**Test**	**Mean**	**SD**	**t**	**P**
Balance (sec)	Pre	8,32	0,64	8,492	0,000*
	Post	7,59	0,44		
Agility (sec)	Pre	5,38	0,28	4,596	0,000*
	Post	5,22	0,18		
Running (sec)	Pre	4,53	0,56	7,362	0,000*
	Post	3,87	0,36		
Catching (m)	Pre	2,48	0,37	8,537	0,000*
	Post	2,02	0,25		
Long Jumping (cm)	Pre	80,15	6,09	-17,232	0,000*
	Post	93,44	4,48		
Throwing (m)	Pre	5,21	0,63	-5,913	0,000*
	Post	6,05	0,39		

*P<0,01, P<0,05. SD: standart deviation, sec:second, m:meter, cm:centimeter

Table 1 includes pretest and posttest data for boys. In all performance tests applied, statistical significance emerged in favor of the post-tests (p<0.01). It was observed that the performance criteria improved and better results were obtained in terms of time and distance when compared to the data obtained in the preliminary tests.

Table 2. Comparison of motor performance tests of preschool females according to pre-test and post-test results

		Female (n=15)			
Variables	**Test**	**Mean**	**SD**	**t**	**P**
Balance (sec)	Pre	10,52	0,51	15,021	0,000*
	Post	9,28	0,51		
Agility (sec)	Pre	6,08	0,35	6,563	0,000*
	Post	5,74	0,33		
Running (sec)	Pre	5,27	0,60	15,072	0,000*
	Post	4,65	0,57		
Catching (m)	Pre	2,52	0,37	4,028	0,001*
	Post	2,39	0,36		
Long Jumping (cm)	Pre	68,30	4,46	-6,441	0,000*
	Post	75,97	5,49		
Throwing (m)	Pre	4,02	0,54	-6,919	0,000*
	Post	4,41	0,51		

*P<0,01, P<0,05, SD: standart deviation, sec:second, m:meter, cm:centimeter

Table 2 includes pretest and posttest data for girls. In all performance tests applied, statistical significance emerged in favor of the post-tests (p<0.01). It was observed that the performance criteria improved and better results were obtained in terms of time and distance when compared to the data obtained in the preliminary tests.

When the performance criteria of balance, agility, running, catching, standing long jump and throwing tests are examined in general; When the data obtained in the posttests of the motor performance tests of both

boys and girls were compared with the pretest results, it was determined that there was a positive improvement in each parameter. This improvement shows statistical significance ($p<0.05$).

Table 3. Comparison of motor performance test results of boys and girls in terms of gender.

Variables	Gender	Test	Mean	SD	Df (mean)	%	Df (%)
Balance (sec)	Male	Pre	8,32	0,63	0,74	-8,85	3,03
		Post	7,58	0,44			
	Female	Pre	10,52	0,5	1,25	-11,88	
		Post	9,27	0,51			
Agility (sec)	Male	Pre	5,38	0,27	0,16	-2,97	2,62
		Post	5,22	0,18			
	Female	Pre	6,08	0,35	0,34	-5,59	
		Post	5,74	0,33			
Running (sec)	Male	Pre	4,53	0,55	0,66	-14,57	2,78
		Post	3,87	0,35			
	Female	Pre	5,26	0,59	0,62	-11,79	
		Post	4,64	0,57			
Catching (m)	Male	Pre	2,48	0,37	0,46	-18,55	13,77
		Post	2,02	0,24			
	Female	Pre	2,51	0,37	0,12	-4,78	
		Post	2,39	0,36			
Long Jumping (cm)	Male	Pre	80,15	6,09	13,29	16,58	5,33
		Post	93,44	4,47			
	Female	Pre	68,29	4,45	7,68	11,25	
		Post	75,97	5,49			
Throwing (m)	Male	Pre	5,21	0,63	0,83	15,93	6,48
		Post	6,04	0,39			
	Female	Pre	4,02	0,54	0,38	9,45	
		Post	4,4	0,51			

* SD: standart deviation, sec:second, m:meter, cm:centimeter, Df: difference, %:percent

Table 3 shows the comparison of motor performance test results of boys and girls in terms of gender. According to the table, it is seen that the post-test data of boys and girls are better and the movement training process contributes to the performances of both groups.

When the data obtained is examined in terms of gender; It is understood that girls show more improvement in percentage terms than boys in balance and agility tests. While girls developed at a rate of 11.88%, this development occurred at a rate of 8.85% for boys. Similarly, girls achieved better results in percentage terms compared to boys in their agility performance. Girls improved by 5.59% and boys improved by 2.97%. Girls improved 3.03% more than boys in balance performance. A similar result was found in agility performance. It was observed that girls achieved 2.62% better results than boys. Contrary to the results obtained in balance and agility performances, it was determined that boys showed more improvement in running, catching, standing long jump and throwing performance compared to girls. Boys achieved better results by 2.78% in the running test, 13.77% in the catching test, 5.33% in the long jump test and 6.48% in the throwing test.

However, it is seen that the largest percentage difference between genders occurs in catching performance (13.77%), while the smallest percentage difference occurs in quickness data (2.62%).

DISCUSSION AND CONCLUSION

This study was conducted to examine the effects of physical education and sports activities on the motor skills of preschool children in terms of gender differences. In the study, the motor skills of a total of 30 preschool children, 15 boys and 15 girls aged 5-6, were tested. Pretest and posttest data of the movement training program, which lasted 12 weeks, 2 days a week and 30 minutes a day, and included physical education and sports movements, were compared. To evaluate motor performance criteria, balance, agility, running, catching, long jump and throwing tests were applied.

According to the research results, the study process involving physical education and sports movements in preschool children had a positive effect on the motor skill performances of both male (8.85%) and female students (11.88%). In similar studies examining balance performance, it was reported that girls showed more development compared to boys, and the results were in favor of girls (12, 21, 22). Our study is parallel to the

study conducted by Şen (2004) in which static balance performance was examined (23). In another study comparing the balance performances of the control and experimental groups, it was reported that the results obtained were significant in favor of the experimental group (1). Durukan et al. (2016), in their study examining the effect of gymnastics training on balance performance in preschool children, concluded that the post-test data improved the balance parameter of the experimental group (8). Çelebi et al. (2018) similarly reported that the post-test results were in favor of the experimental group (5). These results are parallel to the results obtained in our study. Accordingly, it can be said that the applied movement training program can have a positive effect on balance skills in preschool children and that this development is more in girls than in boys (3.03%).

Data on agility performance indicate that the study, which includes physical education and sports movements, provides improvement in both male (2.97%) and female (11.88%) preschool children. When the results obtained from the data were examined in terms of gender differences, it was shown that the positive change observed in the agility skills of girls was higher than that of boys (2.62%). Yıldırım (2023) noted that there was a statistically significant improvement in agility skills after basic movement training applied 2 days a week (26). In other studies, examining agility performance, it was reported that the improvement in the control groups was less than the experimental groups, but the improvement in the experimental groups was significant ($p < 0.05$). In the study conducted by Avcu (2016), it was reported that the game-based training program improved the agility performance in 5-year-old preschool children (2).

The post-test data obtained in our study indicate that the training program, which includes physical education and sports movements, improves running performance in male and female preschool children. However, it was revealed that the running performance of boys was higher than girls (2.78%). The improvement in the post-test data obtained in boys (14.57%) was greater than the development in girls (11.79%). In studies examining the motor performance of preschool children, there are generally studies in which the post-test data obtained from the experimental groups are better than the pre-test data, running times decrease, and this is expressed as an improvement in performance (1, 2, 25). The results obtained in our study are parallel to similar studies. On the other hand, Çelebi et al. (2018), in their study where they applied the 9 m running test, reported that there was no significant difference in the pre-test and post-test data of the control group (5). It can be said that the contradiction of this situation with the positive development in our study may be due to the different running test applied (9m).

The data obtained in our study on catching, standing long jump and throwing tests indicate that physical education and sports movement training provides positive development in male and female preschool children. However, when gender differences were examined, contrary to the results obtained in balance and agility performances, boys improved more than girls in other parameters. Compared to girls, the improvement in boys was 13.77% in catching performance, 5.33% in long jump performance and 6.48% in throwing performance. When the literature was examined, Avcu (2016) reported that although the game-based education program had a positive effect on the catching performance of 5-year-old preschool children, it did not contribute to long jump and throwing skills (2). There are different studies reporting that physical education and sports activities provide improvement in catching performance (9, 10, 18). Erol (2022), in his study examining the effects of movement training on children aged 4-6, reported that a positive improvement was achieved in throwing performance (9). Durukan (2016) similarly noted that the movement training program made a positive contribution to the development of the standing long jump performance of preschool children (8).

In general, it can be said that educational program applications that include physical education and sports movements can have a positive impact on the balance, agility, running, catching, standing long jump and throwing performance of preschool children. This interpretation is similar to the data obtained in various studies. In addition, it should be evaluated whether the development in children's motor performance is a situation that occurs within the natural course of their growth period or is a result of the contribution of physical education and sports activities.

For this reason, conducting more comprehensive studies in which physical education and sports movements are regularly applied in different and large groups will contribute to the literature.

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