PRINT: ISSN 0973-5070 ONLINE: 2456-6772
Ethno Med, 10(4): 453-460 (2016)
DOI: 10.31901/24566322.2016/10.04.08

The Effect of Movement Education Program on Motor Skills of Children

Nurper Ozbar[1], Sami Mengutay[2], Kursat Karacabey[1] and Tarik Sevindi[3]

[1]Duzce University Faculty of Sport Science, Duzce, Turkey
[2]Halic University School of Physical Education and Sports, Istanbul, Turkey
[3]Aksaray University School of Physical Education and Sports, Aksaray, Turkey

KEYWORDS Motor Development. Physical Education Program For Children

ABSTRACT The aim of this study was to contribute to the improvement of basic motor skills of pre-school children between the ages 4-6 with the help of a movement education program. Another purpose was to provide support to the activity development of a pre-school educational program. Participation was voluntary and 70 children (experimental group=35 and control group=35) took part in this study. The control group attended regular pre-school educational program while the experimental group was given movement education program for an academic year (3 days a week, 1 hour for each day). Paired sample t-test for the assessment of pre and post-tests was used between groups. Independent sample t-test was used for intergroup comparisons. Results show a significant difference for experimental and control group, ($p<0.01$) for motor skills. As a result, it was found in this research which was carried out to investigate motor development of children between 4-6 years old that education programme caused a significant difference in motor development children in experimental group. Consequently, it was determined that education programme positively affected motor development properties of children.

INTRODUCTION

Moving is the most important part of life for children. Therefore, at the age of adulthood physical activity, structured physical activity in early years and the person does not hold the position until the end of its capacity to improve should be noted that not yet. The child's regular physical activity, physical structure, to have the right to a healthy, progressive deterioration of years of delay is the physical structure (Ozbar et al. 2004).

Childhood is the most beautiful age span of the life. Under normal circumstances, childhood is the trouble free period of life and a normal child has no worries except playing. A child's physical performance is dependent on age, sex, socioeconomic class and the level of sports activities in pre-school (Chaddock-Heyman et al. 2013; Mostafavi et al. 2013).

Movement Education, higher levels to develop skills in the field of action is broad. Development of basic movement skills, the child's motor development is the basic element. Movement of the multiplicity of experience, the children themselves and the environment can provide better detection. Movement is in the heart of children's active lives, as they acquire their autonomy in different daily life situations (Mengutay 2005; Lubans et al. 2010).

Movement education activities, children's motor skills and capabilities development is an important factor in moving the development process in the basic movement skills and sports-related movements of the period, the infrastructure to create terms, experts on the subject of consideration on this matter concentration is caused.

Unfortunately, it is common concern all over the world that a lot of numbers of children are not participating in adequate physical activity. Some studies suggest that the time of physical activity engagement and the time to play for pre-school children in early learning settings have to be increased (Stegelin et al. 2014; Cohen 2014).

Physical activity, motor development as an element of increased activity of sensory engine experience reveals the importance of the future. This situation; Piaget by the "early years of the potential to lead to subsequent behavior" is described as. Physical activity is critical for children's normal growth and development and is clearly related to superior academic achievement in primary school classrooms (Mengutay 2005; Becker et al. 2014).

We are connected to the above-mentioned description, the pre-school children applied to the development of movement skills; provide training programs that support the motor skills were investigated.

MATERIAL AND METHODS

Pre-school children between the age of 4 and 6 have been exposed to this study. 35 of these children have participated to the movement ed-

ucation program and other 35 children have participated normal pre-school education program which is implemented by not including action pre-school training program. The support for motor skill development of movement education program is given 3 days a week, 1 hour for each day during 1 academic year. For separately assessment of each child, motor skills (balance, agility, flexibility, ball catch, ball throw, standing long jump, vertical jump, sprint, and hand grip) tests were carried out.

In this study, diet nutrition food program have been conducted in the same way for experimental groups and control groups in order to eliminate the effects of differentiation of nutrition of children. Breakfast, lunch and afternoon tea could be kept under control. A pre-test and a post-test were performed for all participants at the beginning and at end of this programme. Thereinafter, two different groups were evaluated in accordance with measurement criteria specified above. Our measurements results by the comparison of two different groups are compared with the findings of the reviews received (Ozer and Ozer 2014; Tamer 2000; Zorba and Saygin 2013).

Movement Education Program

In the study on experimental groups, 4–6 years old preschool children, movement education program was performed 3 days a week, 1 hour for each day during an academic year. The yearly plan for the program is given in Table 1.

RESULTS

In the age group 4-6, children's motor skill development to be determined by the balance, agility, flexibility, catch, throw, long jump, vertical jump, speed and hand grip is measured, the results of statistical analysis (Table 2).

DISCUSSION

The aim of this study was to contribute to the improvement of basic motor skills of preschool children between the ages 4-6 with the help of a movement education program. Another purpose was to provide support to the activity development of a pre-school educational program. The results obtained by our study are presented as sequenced inline discussion below.

Physical fitness contains cardiorespiratory endurance, muscular endurance, muscular strength, speed, flexibility, agility, balance, reaction time and body composition. Due to different features of these qualifications, physical fitness divides into physical fitness associated with performance and physical fitness associated with health (Graham et al. 2001). While the phys-

Table 1: The movement education program for experimental groups

Months Program	*9*	*10*	*11*	*12*	*1*	*2*	*3*	*4*	*5*	*6*	*Total hours*
Recognition of the body	3	1									4
Walking	3	1									4
Running	1	3	1								5
Skipping		3	1								4
Jumping		1	3	1							5
Muscular Tension and Joint Movement		1	3	1							5
To Hop			1	3	1						5
Leap			1	3	1						5
Slide				1	3	1					5
Balance				1	3	1					5
Rolling					1	3	1				5
Crawling					1	3	1				5
Climbing						1	3	1			5
Swing							3	1			4
Throwing							1	3	1		5
Catching							1	3	1		5
Trundling								1	3	1	5
Ball Ricocheting								1	3	1	5
Kick (Hand and Foot)									1	3	4
Skill Racetracks and Games	2	2	2	2	2		2	2	3	4	21
Total Hours	9	12	12	12	12	9	12	12	12	9	111

Table 2: The motor skill measurements differences of pre-test and post-test for both groups

The difference of pre-test – post test for both group		*Pair differences*			
		n	*Mean ± SD*	*Within group, p*	*Between group, p*
Statics Balance.1 – Statics Balance.2 (s)	Experimental	35	-15.4645± 10.38089	.000*	.000*
	Control	35	-3.5114± 2.28868	.000*	
Dynamic Balance.1 – Dynamic Balance.2 (point)	Experimental	35	-12.8000± 4.89778	.000*	.000*
	Control	35	-6.5714± 1.26690	.000*	
Agility1 – Agility 2 (s)	Experimental	35	1.7557± .65794	.000*	.011**
	Control	35	1.3862± .51954	.000*	
Flexibility 1 – Flexibility 2 (cm)	Experimental	35	-6.1800± 1.29542	.000*	.000*
	Control	35	-1.2514± .80417	.000*	
Catch 1 – Catch 2 (point)	Experimental	35	-1.0886± .24825	.000*	.000*
	Control	35	-.6457± .39358	.000*	
Throw 1 – Throw 2 (m)	Experimental	35	-4.9865± .92523	.000*	.000*
	Control	35	-1.2053± .44195	.000*	
Long Jump 1– Long Jump 2 (cm)	Experimental	35	-30.9379± 14.53800	.000*	.000*
	Control	35	-13.7557± 9.89681	.000*	
Vertical Jump 1 – Vertical Jump 2 (cm)	Experimental	35	-4.1769± 1.10873	.000*	.000*
	Control	35	-2.1483± 1.13706	.000*	
Speed 1 – Speed 2 (s)	Experimental	35	.9596± .36707	.000*	.000*
	Control	35	.3624± .40070	.000*	
Right Hand Grip.1 – Right Hand Grip.2 (kg)	Experimental	35	-4.2140± .71542	.000*	.000*
	Control	35	-1.6414± .74771	.000*	
Left Hand Grip.1 – Left Hand Grip.2 (kg)	Experimental	35	-3.8243± .85614	.000*	.000*
	Control	35	-1.3629± 1.05338	.000*	

* $p<0.01$ ** $p<0.05$

ical fitness associated with health contains cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition, the physical fitness associated with performance contains speed, agility, coordination and explosive strength (Graham et al. 2001; Saygin and Mengutay 2004).

The period up to the age of puberty in girls and boys will not be different between the developments of maintained features (Mengutay 2005). From this perspective, this study proves that there is no any difference between boys and girls up to puberty. The comparison of statistical analysis has been done without any discrimination based on gender. This argument is also indicated by many studies, considering all kind of variables. The growth of psychomotor profiles of both groups is observable but the growth of the experimental groups is statically higher than control group not influenced by gender in-between preschool children (Teixeira Costa et al. 2015).

Experimental group pre-test static balance measure average 13.46 ± 7.80 sec, the post test of static balance average measurement was determined as 28.92 ± 12.85 sec. Control group pretest static balance measure average 13.53 ± 7.33 sec, the post test of static balance average measurement was determined as 17.04 ± 6.61 sec. Between groups, static balance measurement difference of pre posttest is considered and the average difference was found in significant levels that shows the effect of movement education programme ($p < 0.01$). Pre-posttests of the control group have the average difference in static balance measurement 3.51 ± 2.28 sec, where as the experiment group has the average difference in static balance measurement 15.46 ± 10.38 sec when pre and posttests are considered.

As indicated in the article 'Improvement in Gross Motor Performance Between 3 and 5 Years of Age', static balance improvement is highly age-related process, since dynamic force (measured by hopping on one leg) and equilibrium of the body (measured by standing on one leg) improve during this age period, however the effect of movement education program cannot be disregarded. It might be concluded that motor skills development is accelerated by movement education programme during brain development at these ages (Kakebeeke et al. 2012).

The test results are demonstrating also the importance of movement education programme for development of dynamic balance skill. The

measured dynamic balance average is 8.65 ± 1.55 points by pre-test, whereas posttest gives the average of 21.45 ± 5.91 points for experimental group. For the control group, measured dynamic balance average by pre-test is 8.80 ± 1.43 points, measured dynamic balance average of the posttest was determined as 15.37 ± 2.11 points. When the results of pre-posttests of dynamic balance measurement for both groups are compared, the differences between the averages of these two groups were found in significant levels ($p < 0.01$). Pre-posttest of the control group, the average difference measure dynamic balance score 6.57 ± 1.26, experimental group, the average pre-posttest of the difference in dynamic balance measurement is determined as 12.80 ± 4.89 points. From the results, it can be concluded that the children who had movement education programme have significant improvement dynamic balance.

There is no observed relationship between static and dynamic balance of pre-school children. Although, the balance degree of overweight children is low , but it is still better than tall children as indicated. It should be noted that balance performance is generally improved with increasing ages (Ozer and Ozer 2014).

Experimental group pre-test average for agility is measured as 6.57 ± 0.48 sec, however 4.81 ± 0.39 sec is measured as the posttest average for agility. Control group pre-test average for agility is measured as 6.69 ± 0.69 sec, where 5.30 ± 0.46 sec is the posttest average for agility. Between groups, when statistical difference of pre-tests difference and post-tests difference is considered, it was found in significant levels ($p < 0.05$). Pre-posttest of the control group, the difference in agility measuring 1.38 ± 0.51 points average, where pre-posttest of the experimental group's average difference in agility measurement is determined as 1.72 ± 0.65 points.

Development in the speed-motion of children between 6-9 years old shows the greatest accelerated progress (Muratli 2013). However, the gender-specific differences in strength properties start to be valid in this period. Running speed of boys increases continuously between the ages of 5-17 , however for girls, running speed increases continuously between the ages of 5-14 as indicated (Chatterjee et al. 1993).

The measured flexibility average is 21.32 ± 2.86 cm by pre-test, whereas post-test gives the average of 27.50 ± 2.72 cm for experimental group. For the control group, measured flexibility average by pre-test is 19.40 ± 5.11 cm, measured flexibility average of the post-test was determined as 20.65 ± 4.96 cm. Between groups, pre-posttest of the difference between the average flexibility measurement difference was found in significant levels ($p < 0.01$). Pre-posttest of the control group, the average difference in measurement flexibility 1.25 ± 0.80 cm, the pre-posttest of the experimental group, the average difference in measurement of flexibility is determined as 6.18 ± 1.29 cm.

The flexibility feature of girls increased with age, but flexibility of boys decreases and remains constant with the age increase, for different results as many studies have been done (Chatterjee et al. 1993). Fjortoft (2000), 24.6 cm 6 years as children have found the value of flexibility.

Experimental group has the average of 1.88 ± 0.24 by pre-test of ball catch measurement, the average of postest for ball catch measurement has been determined as 2.97 ± 0.04 points. The control group has the average of 1.89 ± 0.24 points at pre-test by ball catch measurement,on the other hand, the posttest results have been determined as 2.54 ± 0.30 points.The post test results differs from each other realizing that maximum possible point is 3.

When the statistical differences are considered, difference of pre-posttest inbetween groups was found in significant levels ($p < 0.01$). The pre-posttest of the control group has the average of 0.64 ± 0.39 points difference, The pre-posttest of experimental group has the average of 1.08 ± 0.24 points difference.

Experimental group pre-test average is 6.20 ± 0.74 m by ball throwing measurement, the posttest average for ball throwing measurement was determined as 11.19 ± 1.28 m. At pre-test of Control group, the average of ball throwing measurement is determined as 5.91 ± 0.54 m, where the post-test shows that the average ball throwing measurement is 7.12 ± 0.76 m. Between groups, Statistical difference of averages of pre and posttest was found in significant levels ($p < 0.01$). Pre-posttest of ball throwing measurements of the control group shows average difference as 1.20 ± 0.44 m, whereas the experiment group has 4.98 ± 0.92 m as the average pre-posttest of ball throwing measurement. It can be figured out that physical strength and accuracy for throwing a tennis ball is increasing by increasing ages, however most important con-

clusion to be drawn is to indicate that movement education programme is crucial to improve these abilities.

Experimental group pre-test gives the average of 59.62 ± 11.60 cm by drop jump measurements and by post-test, it is turned out to be 90.56 ± 14.07 cm. Likewise, Control group pretest gives the average of 62.70 ± 12.56 cm by drop jump measurements, at post-test it was determined as 76.45 ± 14.78 cm. When the differences are statistically analyzed, pre-posttest difference of drop jump measurement was significant ($p < 0.01$). By pre-posttest of the control group, the average difference by drop jump measurement is 13.75 ± 9.89 cm,whereas the pre-posttest of the experimental group has the average difference of 30.93 ± 14.53 cm by long jump measurement.

Chow and Louie (2013), in their study, it is indicated that 4-6 year-old children who are attending private schools are more advantageous in terms of motor skills than 4-6 year-old children who are attending public school, although there are not any statistical difference between their developing physical features. It is also argued that the advantage is arising from sufficient sport activities participation of private school children.

Dursun (2004), in his graduate studies, 6 year-old children have an average of 82 cm by drop jump measurement before the 12-week physical training program, however experimental group of children have an average of 107 cm by drop jump measurement after the 12-week physical training programme. On the other hand, control group of children who aren't exposed to this program have an improvement from 90.21 to 94.10 cm by the drop jump measurement, when pre and post tests values are considered. Turgut (2006), in his study, it is found out that 86.81±15.37 cm is determined as an average value for 6 year-old children by standing long jump, whereas Fjortoft (2000) indicated the average value as 104cm.It can be noted that children after the programme have more tendency to jump up higher.

The importance of programme is also proven by vertical jump tests. Experimental group has the pre-test average of 22.16 ± 3.93 cm by vertical jump measurement. The pre-test average of experimental group is slightly slower than the pre-test average of control group, that is 23.01 ± 4.20 cm. However post-test results demonstrate that children who experienced movement education program have more ability to jump up higher. Control group of children have the average of 25.16 ± 3.60 cm, whereas experimental group has 26.34 ± 3.81 cm. When the groups average are statistically analyzed, the pre-posttest difference for vertical jump measurement was found in significant levels ($p < 0.01$). Pre-posttest of the control group has the average difference 2.14 ± 1.13 cm in vertical jump measurement, the pre-posttest of the experimental group has the average difference of 4.17 ± 1.10 cm in vertical jump measurement.

In the research of Teixeira Costa, the sample comprised 324 children (154 boys and 170 girls). It was divided into two groups: the control group with 162 children, the experimental group with 162 children. Through a specific program, effect of structured physical education is analyzed by comparing pre- and post-tests of these two groups. At pre-test, the parameters of coordination and balance, body schema, spatial organization and temporal organization are higher in the control group compared to those obtained in the experimental group. It means that before the program, control group's average was better than the experimental groups average's. However, in the post-test, the experimental group had higher scores than the control group, after the implementation of the physical education specific program that influences growth and development of children in a positive manner (Teixeira Costa et al. 2015).

Experimental group has the pre-test average of 4.50 ± 0.31 sec. by speed measurement,where it is turned out to be 3.54 ± 0.31 sec at post-test. Control group has the pre-test average of 4.43 ± 0.31 sec by speed measurement, whereafter the average of the posttest is found out as 4.07 ± 0.31 sec by speed measurement. Although the difference between pre-test values of both group is slightly low, a markable difference is observed at post-tests results of both group. Statistically speaking, the differences between pre and posttest of both groups were found significantly different ($p < 0.01$). Pre-posttest of the control group has the average difference of 0.36 ± 0.40 sec speed measurement,whereas the experimental group has the average difference of 0.95 ± 0.36 sec, when pre and post tests results of experimental groups are analyzed.

Turgut (2006), in his study, it is indicated that 6 year-old girls sprint 20 meter with the average time of 5.28 ± 0.54 sec ,whereas 7 year-old

girls have the average time of 4.94 ± 0.47 to sprint 20 meter. Ceylan et al. (2014) found that the time required for running 30 meters for 7 years-old girls is averagely 8.30±.78 sec, whereas boys have the average of 7.64±.75 sec.

Katie et al. (2003), found that there is a significant difference between children just educated with table education and children attended to sport training along with table education about grip strength. Loko et al. (2000), found that children who are 10-17 years of age and do exercise regularly have more powerful extensor muscles than *children* of the *same age*. Faigenbaum et al. (2002), found that there are significant improvements about 1 RM and strength of children at the end of the movement and strength education program.

Experimental group of children has the average of 18.48 ± 2.86 kg by right-hand grip pre-test measurement and the average of 17.54 ± 2.88 kg by the left-hand grip pre-test measurement. During the post-test, 22.69 ± 2.93 kg is averagely measured by post right-hand grip force measurement. Meanwhile, 21.37 ± 3 kg is averagely measured by left hand measurements.

Control group of children has the average of 18.40 ± 2.79 kg by right-hand grip pre-test measurement and the average of 17.43 ± 2.82 kg by the left-hand grip pre-test measurement.

Both groups averages by pre-test are similar, however post-test results are differing distinguishably as proving the contribution of movement education programme.

At post-test of control groups, the right-hand grip force measurement average is 20.04 ± 2.46 kg and the left-hand grip force measurement average is determined as 18.79 ± 2.47 kg. Statistically speaking, pre-posttest average differences of both groups are differing at significant levels ($p < 0.01$). Pre-post test difference of Control group is found out averagely 1.64 ± 0.74 kg by right-hand grip force measurement, where this value by left-hand is 1.36 ± 1.05 kg. On the other hand, Pre-post test difference of Control group is found out averagely 4.21 ± 0.71 kg by right-hand grip force measurement, where this value by left-hand is 3.82 ± 0.85kg. No matter right or left handed the children are, experimental group of children experienced more efficient development by using hands. Turgut (2006), in his study, the average hand grip force of 6 year-old girl is indicated as 8.02 ± 1.85 kg.

Yarimkaya and Ulucan (2015) in their study, also a significant difference was determined between post-test values of experimental and control groups participated in the research in terms of statistics ($p<0.05$). When pre-test and post-test of students in experimental group participated in the research were compared, it was determined that there was a statistically significant difference ($p<0.05$). In these comparisons, it was found that post-test values were higher than pre-test values.

Experiments of static balance, dynamic balance, agility flexibility, catch, throwing, standing long jump, vertical jump, and speed and hand grip between two groups shows statistically significant differences were found. Most important outcome of this study and these experiments is that this movement education programs provide better development of motor skills for children.

Physical activities play significant roles at normal growth and development process of children. Additionally, vital importance of these activities comes to the forefront when a better development of community health is considered. People who are doing physical activities regularly have better physical work capacity and faster working muscle and neural systems when these people are observed and compared with others, who aren't doing these activities regularly, are sedentary and at same ages with compared people (Gallahue and Ozmun 2006; Rovegno and Bandhauer 2013).

Another study in the early years indicated that physical activity is crucial for physical development body during the childhood. In addition to this, the encouragement of physical activity programs for motor skills will always have positive influences not only on children but also on future community health (Kahle and Emmel 2002).

According to our findings, the application of the usual pre-school physical education programs for motor skills of children alone is not enough, additionally, implementation of different motor skills development programmes has to be supported (Ozbar et al. 2015).

CONCLUSION

As a result of this research, which was carried out to investigate motor development of children between 4-6 years old, it is found out that education programme caused a significant difference in motor development for children in

experimental group. Consequently, it was determined that education programme positively affected motor development properties of children.

To increase efficient collaboration of body and mind is one of the most important objectives of physical activity. Movement education programmes have fundamental role to increase coordinative functions of body and mind. Therefore, physical education programmes have to be adjusted according to needs and characteristics of children to increase their fundamental skills.

Movement education activities that are aimed at preschoolers provide not only healthy growth for children but also helping children develop physical activities habit for following ages. Necessity of movement education at preschool education programs including physical activities and also allocating more time for these activities are inarguable truth.

Likewise, it is essential to protract researches which are aimed at laying emphasis on physical activities of preschoolers and to deepen the focuses of these researches.

REFERENCES

Becker DR, McClelland MM, Loprinzi P, Trost SG 2014. Physical activity, self-regulation, and early academic achievement in preschool children. *Early Education and Development,* 25(1): 56-70.

Ceylan HI, Saygin O, Irez GB 2014. The examining body composition, sprint and coordination characteristics of the children aged 7-12 years. *Anthropologist*, 18(3): 859-867.

Chatterjee S, Mandal A, Das N 1993. Physical and motor fitness level of Indiana school-going boys. *Journal of Sports Medicine and Physical Fitness*, 33: 268-277.

Chaddock-Heyman L, Erickson KI, Voss MW, Knecht AM, Pontifex MB, Castelli DM, Hillman CH, Kramer AF 2013. The effects of physical activity on functional MRI activation associated with cognitive control in children: A randomized controlled intervention. *Frontiers in Human Neuroscience,* 7: 72.

Chow BC, Louie LHT 2013. Difference in children's gross motor skills between two types of preschools. *Perceptual & Amp; Motor Skills*, 116(1): 253-261.

Cohen KE, Morgan PJ, Plotnikoff RC, Callister R, Lubans DR 2014. Fundamental movement skills and physical activity among children living in low-income communities: A crosssectional study. *International Journal of Behavioral Nutrition and Physical Activity,* 11(1).

Dursun MZ 2004. *The Effect of Basic Skills Containing Special Physical Education Bill of Preschool Children's Motor Skills Access for 6 Years.* Master Thesis. Ankara: Hacettepe University.

Faigenbaum AD, Milliken LA, Loud RL, Burak BT, Doherty CL, Westcott WL 2002. Comparison of 1 and 2 days per week of strength training in children. *Res Q Exerc Sport,* 73(4): 416-424.

Fjortoft I 2000. Motor fitness in pre-primary school children, The Eurofit Motor Fitness Test explored on 5-7 years-old children. *Pediatric Exercise Science,* 12: 424-436.

Gallahue DL, Ozmun JC. 2006. *Understanding Motor Development: Infants, Children, Adolescents, Adults.* 6th Edition, New York, McGraw-Hill.

Graham G, Holt/Hale SA, Parker M 2001. *Children Moving A Reflective Approach to Teaching Physical Education.* 5th Edition. Mountain View, California: Mayfield Publishing Company.

Kahl H, Emmel J 2002. The motor aktivity study segment as pilot study of the child and adolescent health survey. *Gesundheitswesen*, 64(1): S114-118.

Kakebeeke TH, Caflisch J, Locatelli I, Rousson V, and Jenni OG 2012. Improvement in gross motor performance between 3 and 5 years of age. *Perceptual & Motor Skills,* 114: 795-806.

Katie M, Brad SM, Joanne K, Linda DV, Terence JW 2003. Contribution of timetabled physical education to total physical activity in primary school children: Cross-sectional study. *BMJ*, 327: 13-18.

Loko J, Aule R, Sikkut T, Ereline J, Viru A 2000. Motor performance status in 10 to 17-year-old Estonian girls and boys. *Scand J Med Sci Sports,* 10(2): 109-113.

Lubans DR, Morgan PJ, Cliff DP, Barnett LM, Okely AD 2010. Fundamental movement skills in children and adolescents: Review of associated health benefits. *Sports Medicine,* 40(12): 1019-1035.

Mengütay S 2005. *Movement Development and Sports in Children*. Istanbul: Morpa Cultural Publication.

Mostafavi R, Vahid Z, Hakimeh A, Samaneh HH 2013. The effects of SPARK physical education program on fundamental motor skills in 4-6 year-old children. *Iranian Journal of Pediatrics,* 23(2): 216-219.

Muratli S 2013. *Children and Sports.* Ankara: Nobel Publishing Company.

Ozbar N, Mengutay S, Agopyan A 2015. Observing the effect of movement education programme on body composition for children of 4-6 age. *International Peer-Reviewed Journal of Humanities and Academic Science,* 4(13): 111-122.

Ozbar N, Kayapinar FÇ, Pinar S, Karakas S 2004. The Characteristics of Physical and Anthropometric Development of Kindergarten Children, A Year Pilot Study. *The 10th ICHPER-SD Europe Congress and The TSSA 8th International Sports Science Congress*, November 17-20, Antalya, Turkey.

Ozer DS, Ozer K 2014. *Cocuklarda Motor Gelisim*. 8th Edition. Ankara: Nobel Publishing Company.

Rovegno I, Bandhauer D 2013. *Elementary Physical Education Curriculum and Instruction.* Burlington, MA: Jones and Bartlett Learning.

Saygin O, Mengutay S 2004. Girls and boys evaluation of children's physical activity levels and physical activity intensity. *Journal of Sports and Medical,* 12(1): 13-16.

Stegelin DA, Anderson D, Kemper K, Wagner J, Evans K 2014. Exploring daily physical activity and nutrition patterns in early learning settings: Snapshots

of young children in head start, primary, and after-school settings. *Early Childhood Education Journal,* 42(2): 133-142.

Tamer K 2000. *Sports Performance Measurement and Evaluation of Physical-Physiological*. Ankara: Bagirgan Publisher.

Teixeira Costa HJ, Abelairas-Gomez C, Arufe-Giráldez V, Pazos Couto JM, Barcala-Furelos R 2015. Influence of a physical education plan on psychomotor development profiles of preschool children. *J Hum Sport Exerc,* 10(1): 126-140.

Turgut A, Cetinkaya V 2006. Determination of Some Motor Characteristic in 6-11 Age Group Girls Children. *9th International Sports Science Congress,* 3-5 November, Mugla/Turkey.

Yarimkaya E, Ulucan H 2015. The effect of movement education program on the motor development of children. *International Journal of New Trends in Arts, Sports and Science Education,* 1: 37-48.

Zorba E, Saygin O 2013. *Physical Activity and Physical Fitness.* Ankara: Firat Typography.

Paper received for publication on January 2015
Paper accepted for publication on October 2016